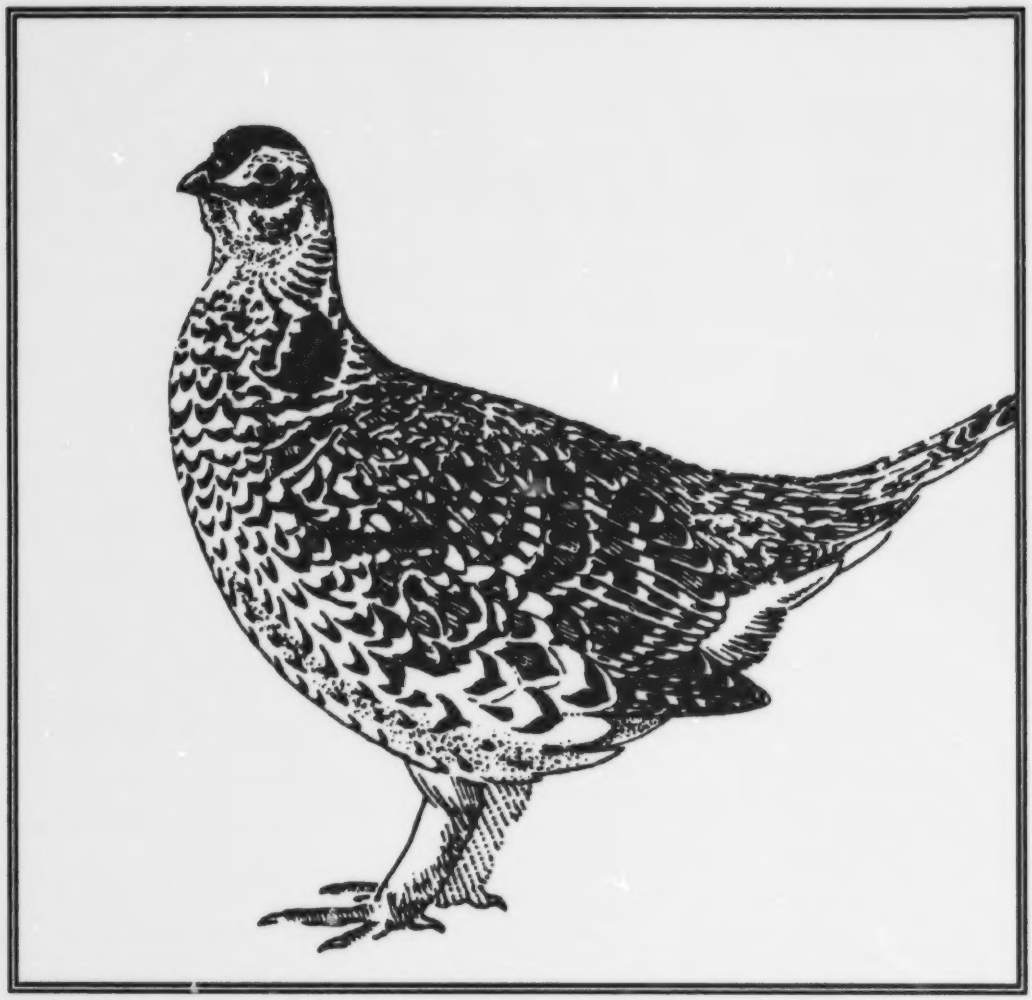


Upland Game Bird Management Plan

Wildlife

Manitoba
Natural Resources
Wildlife

Upland Game Bird

Management Plan

Prepared by:

Glen Suggett

Manitoba Natural Resources

Wildlife Branch

August 1991

92-02178/

Upland Game Bird Management Plan

Reviewed by: Murray Gillespie

Murray Gillespie
Game Bird Manager

Reviewed by: Merlin W. Shoesmith

Merlin W. Shoesmith
Chief, Game Management

Approved by:

Arthur Hoole
Director

Acknowledgements

This plan was prepared by Glen Suggett based on an earlier draft and initial literature review completed by Chuck Dixon. Other staff have also contributed helpful information and undertaken monitoring efforts on their own initiative. The Regional Wildlife Managers reviewed earlier drafts of this plan and offered useful advice, as did additional branch staff. The Upland Game Bird Chairman of the Manitoba Wildlife Federation, Dale Garnham, provided a great deal of assistance and reviewed an earlier draft of this document.

Executive Summary

For the outdoor enthusiast a flock of sharp-tailed grouse cackling into the crisp autumn air from the edge of a grain field is an essential part of the prairie experience. Beyond the grain fields and grasslands, the forests would not be complete without the drumming of ruffed grouse in spring or the sight of a spruce grouse motionless on the limb of a nearby evergreen. Farther north, there are few who have travelled near the Hudson Bay coast without being startled by the sudden explosion of feathers as ptarmigan suddenly materialized from the tundra.

Upland game birds have long been part of the Manitoba landscape. As the province was settled, grouse and other wild game were a supplemental source of food in difficult times. In some parts of the province upland game birds continue to be necessary for subsistence purposes, but for the most part they are enjoyed by recreational hunters and naturalists. Upland game birds contribute both to the quality of life enjoyed by many Manitobans and to the sustainable development of the province.

The greater prairie chicken disappeared from Manitoba along with its tall grass prairie habitat, but several species of upland game birds have been introduced to southern Manitoba. The most abundant is the gray (Hungarian) partridge, thriving near farmsteads, undeveloped road allowances and hedgerows in the southwest. In the Pembina River Valley and other areas of suitable habitat, wild turkeys have been released. The population has reproduced in the wild and been large enough to warrant regular spring hunting seasons through the 1980's and 1990's. Sufficient numbers of ring-necked pheasants existed in the province during the 1940's to allow for hunting seasons, but Manitoba's habitat and severe winters proved unsuitable for these birds in

the long term. The Manitoba Wildlife Federation is attempting to introduce a hardier strain, a cross bred Bohemian - ring-necked pheasant, but it will be some years yet before a wild population may be established.

Upland game bird management is of interest to biologists, hunters and naturalists alike. Recently wildlife biologists have begun to re-examine many of the basic tenets of upland game bird management and the factors that influence population levels. Long held theories that hunting compensates for natural mortality and that predators have little impact are now in question. Management of upland game birds has been further complicated by the development of new pesticides and herbicides. Their long term effects are only now becoming apparent. Also, and perhaps most importantly, the continuing loss of wildlife habitat and the intensifying use of the habitat that does remain is a major concern in the southwestern portion of the province.

The Upland Game Bird Management Plan establishes a framework for maintaining and enhancing the viability of various populations, while managing each species to maximize its recreational value. It is intended to guide upland game bird management in Manitoba for the next decade, though the plan itself will continue to be refined on an annual basis.

The province is divided into seven major management units in the plan, based on a grouping of existing Game Hunting Areas. Monitoring activities will be conducted annually in these management units to determine the status of each species. This will require improved monitoring techniques and a greater effort in collecting data. Populations will be managed for both viewing and hunting purposes, with harvest regimes and strategies for recreational use designed with these objectives in mind. Hunting seasons will remain relatively long, while daily bag limits will be adjusted

annually as appropriate for each management unit.

Once adequate mechanisms are in place to better monitor population trends, a predetermined bag limit regime outlined in this plan will be triggered by population trend data for each management unit. The harvest strategy is intended to encourage more outings by hunters to maximize recreational and economic benefits, while avoiding an excessive kill. In accordance with departmental policy, subsist nce users will be given first consideration and resident recreational hunters will be given a higher priority with respect to allocation of the harvest than non-residents.

Upland game birds are essentially a product of habitat. Preservation and management of key parcels of high quality habitat in Wildlife Management Areas is essential, however, this alone will not ensure that present and future demands placed on this resource can be sustained. The number of hunters has declined through the 1980's, but some 30,000 hunters may still be expected to take to the field annually. The adoption of sound soil and water conservation measures on private lands, presently being promoted through the North American Waterfowl Management Plan and other conservation oriented programs, is essential to the long term security of most upland game bird populations. Combined with enlightened management of individual species, these birds will be able to sustain related subsistence and recreational use well into the future.

Table of Contents

Acknowledgements i

Executive Summary ii

Table of Contents v

Introduction 1

Part I Native Upland Game Birds 4

Sharp-tailed Grouse 5
- Population Goals and Monitoring 8
- Habitat Management 10
- Harvest Strategy 12
- Viewing and Interpretation Strategy 13

Ruffed Grouse 15
- Population Goals and Monitoring 17
- Habitat Management 18
- Harvest Strategy 19
- Viewing and Interpretation Strategy 20

Spruce Grouse 21
- Population Goals and Monitoring 23
- Habitat Management 23
- Harvest Strategy 24
- Viewing and Interpretation Strategy 25

Willow Ptarmigan 26
- Population Goals and Monitoring 28
- Habitat Management 29
- Harvest Strategy 29
- Viewing and Interpretation Strategy 29

Rock Ptarmigan 30
- Population Goals and Monitoring 31
- Habitat Management 32
- Harvest Strategy 32
- Viewing and Interpretation Strategy 32

Greater Prairie Chicken 33
- Population Goals and Monitoring 35
- Habitat Management 36
- Harvest Strategy 37
- Viewing and Interpretation Strategy 37

Part II Exotic Game Birds 38

Gray Partridge 39
Population Goals and Monitoring 41
Habitat Management 41
Harvest Strategy 42
Viewing and Interpretation Strategy 43

Wild Turkey 44
Population Goals and Monitoring 46
Habitat Management 46
Harvest Strategy 47
Viewing and Interpretation Strategy 48

Pheasant 49
Population Goals and Monitoring 50
Habitat Management 51
Harvest Strategy 51
Viewing and Interpretation Strategy 52

Part III Approach to Upland Game Bird Management 53

Demand for Upland Game Birds 54

Population Monitoring 58

Resource Allocation Strategy 58
Resident of Manitoba and Canada Hunting Seasons Regime 61
Non-resident of Canada Hunting Seasons Regime 62
Bag Limits 64

Dog Training on Native Grouse 66

Captive Rearing of Upland Game Birds 68

Shooting Preserves 70

Conclusion 74

Bibliography 75

Endnotes 83

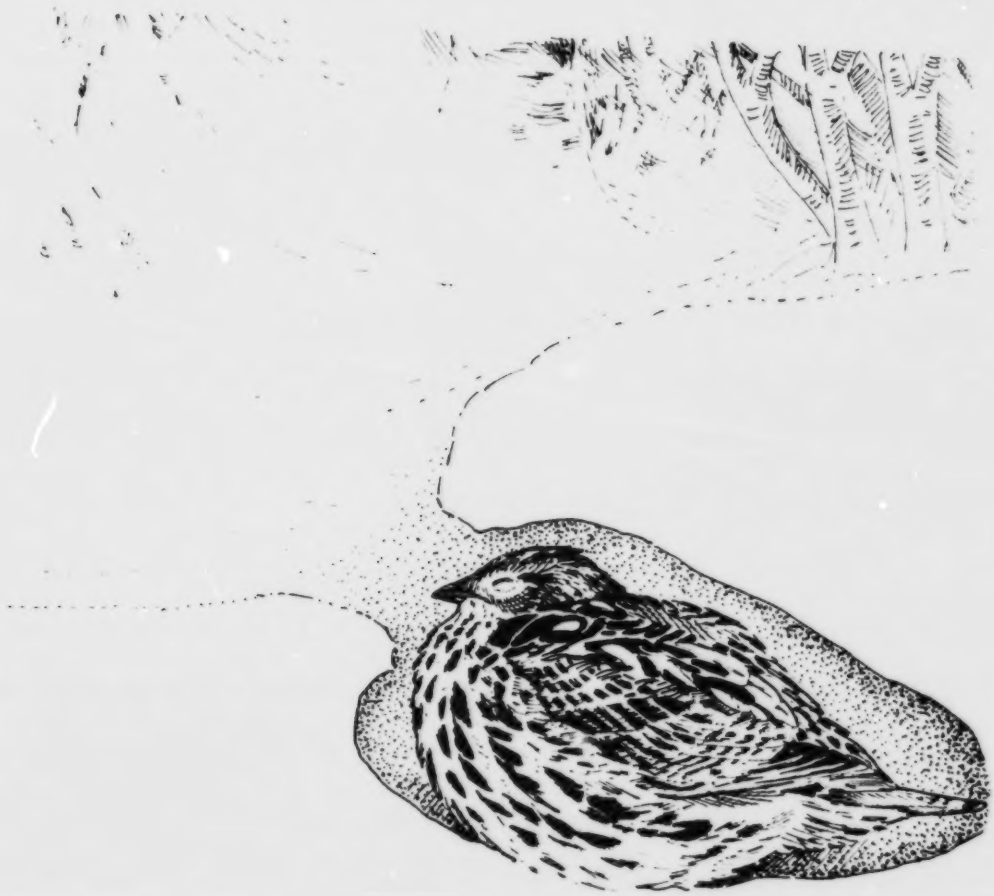
Introduction

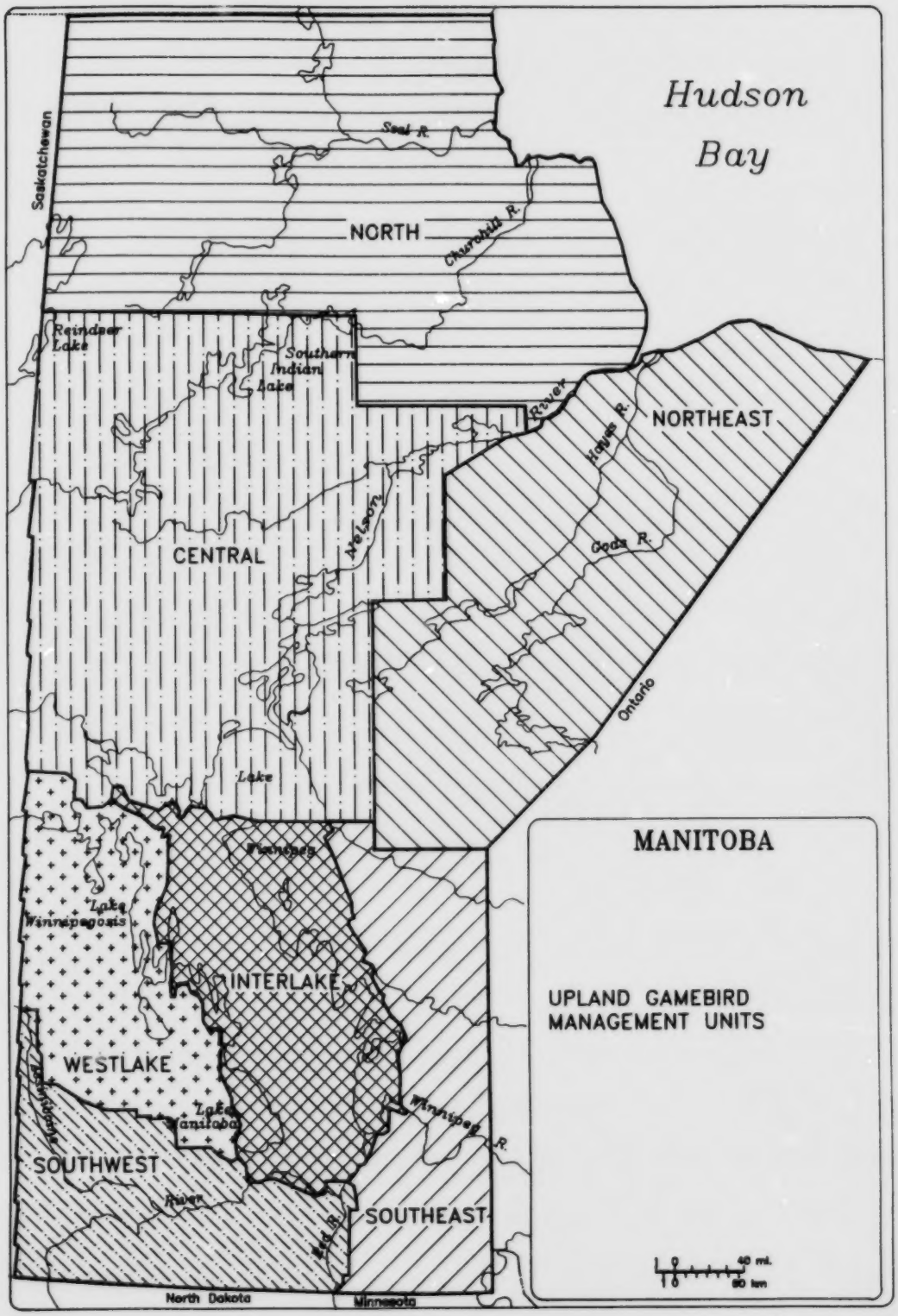
Upland game birds in Manitoba as set out under Schedule "A" of The Wildlife Act are the responsibility of the provincial government. The Act identifies sharp-tailed grouse (*Pedioecetes phasianellus*), ruffed grouse (*Bonasa umbellus*), spruce grouse (*Canachites canadensis*), willow ptarmigan (*Lagopus lagopus*), rock ptarmigan (*Lagopus mutus*), gray (Hungarian) partridge (*Perdix perdix*), wild turkey (*Meleagris gallopavo*), and ring-necked pheasant (*Phasianus colchicus*) as game birds. Greater prairie chicken (*Tympanuchus cupido*) are listed under Division 6 of Schedule "A" as a protected species.

The Wildlife Branch plays an important role in the conservation of these birds. The purpose of this plan is to identify the direction upland game bird management will take in Manitoba, identify priorities, focus implementation efforts and keep those concerned better informed of management objectives and their rationale. Although the plan takes a long term approach to management, it will be refined on an annual basis as new information comes to light.

Manitoba has been divided into seven management units to allow for better management of specific population segments. These are the North, Northeast, Central, Westlake, Interlake, Southeast and Southwest Upland Game Bird Management Units. These management units are merely a grouping of several Game Hunting Areas that share common characteristics with respect to upland game bird populations. The units conform to the boundaries of the existing Game Hunting Areas in order to ensure that baseline data collected for many years may still be used effectively.

The Upland Game Bird Management Plan provides individual plans for each species, but recognizes that management of all upland game birds must be integrated. Part I deals with native upland game birds, while Part II discusses exotic game birds that have been introduced to Manitoba. Part III outlines the Wildlife Branch's approach to upland game bird management in Manitoba and sets out a framework for establishing seasons and bag limits for various species.




Hudson Bay
Saskatchewan
Seal R.
NORTH
Churchill R.
Reindeer Lake
Southern Indian Lake
River
Hayes R.
NORTHEAST
CENTRAL
Nelson
Gods R.
Ontario
Lake
Winnipegosis
INTERLAKE
WESTLAKE
Lake Manitoba
Assiniboine
River
SOUTHWEST
Red R.
SOUTHEAST
Winnipeg R.
North Dakota
Minnesota
MANITOBA
UPLAND GAMEBIRD MANAGEMENT UNITS
0
40 mi.
80 km

Part I

Native Upland Game Birds

Sharp-tailed Grouse

(*Pedioecetes phasianellus*)

Sharp-tailed grouse thrive where there are grasslands, aspen parkland or recently burned woodlands and sedge meadows. Their food consists of insects, buds and catkins of aspen, birch, or willow, along with a variety of wild berries. Agricultural crops such as alfalfa, buckwheat, oats and other cereal grains are also important foods where they are available.

Sharp-tailed grouse use leks, commonly known as dancing grounds, in the spring for breeding purposes. Leks are usually found atop slightly elevated hills with short grassy cover, offering good visibility. In some cases, lek locations may persist even after the grassland has been burned over or converted into a cultivated field. Males compete for the dominant location in the centre of the lek and the less successful ones are relegated to the fringe.[1] A dominant male often mates with more than one hen, while some males, usually the young from the previous year, may not have the opportunity to breed at all. Males begin to gather on the leks as early as mid March, depending upon the extent of the snow melt, but breeding activity most commonly occurs in the late April and early May.

Nesting cover utilized by sharp-tailed grouse tends to vary from the prairies of the southwest to the northern forests, but grasslands are preferred. Brushy or wooded sites are only used where grassed cover is unavailable. Clutch size usually varies from nine to twelve eggs, and the peak of the hatch in southern Manitoba usually occurs in the first week in June. Sharp-tailed grouse are persistent and may nest again if the first clutch is destroyed. The hen will not attempt to renest if the brood is lost.

Brood rearing habitat consists of short grasslands, or openings in wooded areas with an abundance of forbs and insects. Berry-producing or catkin bearing shrubs are important for winter foods, but are not used for brood rearing except as escape cover. Sharp-tailed grouse are well adapted to arid conditions and make efficient use of moisture. Most of their requirements for water are supplied through dew soaked plant matter and other foods, but they will drink surface water when necessary.[2]

The size of the autumn population varies from year to year depending on the number of hens that nest, the clutch size, hatching success and chick survival.

Predators take a significant number of hens and destroy many nests. In addition to predation, accidents involving fences, wires, windows, and vehicles account for some losses. Pesticides, herbicides, and adverse weather also take their toll, especially of the chicks in the first two weeks of life. Peak sharp-tailed grouse populations are achieved through successive years of high nesting success. Nesting success and brood survival are the key to abundance in sharp-tailed grouse.[3]

Sharp-tailed grouse are fewer than they once were in southwestern Manitoba but populations appear to be stable in the Interlake and southeastern Manitoba. In the Porcupine Hills and the area north of Grand Rapids, numbers have increased in response to extensive wildfires in the late 1980's that created favourable habitat. Sharp-tailed grouse have been dubbed the "phoenix bird" by some researchers, impressed by their ability to move into burned areas and increase in number in years following a fire. They seemingly materialize from the burned landscape like the legendary phoenix which arose from its own ashes.

Most sharp-tailed grouse in agricultural areas live in small fragments of remnant habitat interspersed with farmland. Here the effects of predation and hunting are more pronounced and there may be insufficient cover for the birds to survive the winter. The number of birds remains low due to their increased vulnerability to both predation and hunting pressure. The reappearance of birds in depleted cover is often precluded by the long distances between blocks of suitable habitat. In these situations, excessive predation combined with over-hunting may eliminate sharp-tailed grouse population segments in their entirety.

The use of pesticides and herbicides may be having a negative impact on grouse populations as well. If sharp-tailed grouse are not killed outright by the

application of a pesticide, such as carbofuran, the absence of food in the form of insects may weaken young birds and make them more vulnerable to predators. The effects and significance of these chemicals is not fully known and requires further study. The cost of trace contaminant analysis is considerable, so special funding and cooperation with other agencies would be necessary to investigate this possible source of mortality more thoroughly.

In recent years low fur prices have discouraged trappers from pursuing foxes, raccoons and other predators of sharp-tailed grouse. Combined with the loss of habitat and the deterioration of that which remains, predators expend less effort in locating their prey than they did in the past. However, efforts to reduce predators over a wide area through poisoning or other means will not be undertaken in an effort to manage sharp-tailed grouse populations. This approach is seldom effective and can lead to the destruction of non-target species. Improved habitat management that will make lands more attractive to grouse and less so for predators is the most desirable means of improving the survival of grouse.

Population Goals and Monitoring

Efforts to monitor sharp-tailed grouse in Manitoba began in the Broomhill area in 1959, when a spring survey transect was established. This initiative was expanded in 1961 when conservation officers were asked to assist in identifying leks in the various ecological regions of the province and undertake annual counts. Between 1961 and 1973 yearly counts were made in various parts of the province, but primarily in the Broomhill and Langruth areas. The data collected were often incomplete due to

adverse weather conditions, other staff time commitments, and the tendency for some lek locations to change from year to year. Since 1973 there has been no systematic attempt to acquire data across the province, apart from efforts to monitor populations in the Portage Sandhills and Delta Marsh area, as well as portions of the Interlake. Researchers working on specific projects in the Chatfield-Hodgson area and in the Shilo-Spruce Woods area have also provided useful data related to population trends on their study sites.

There are insufficient population data presently available to accurately estimate the numbers of sharp-tailed grouse or assess the annual harvest in the various parts of the province. Hunter check stations proved fruitless in the Broomhill area due to the extent of the road network, but some data are available from the check station set up annually at Langruth. Age/sex ratios were determined for most years from the early 1960's until the mid 1970's when the check station was discontinued. The establishment of systematic spring surveys in each management unit, and improved efforts to assess the extent of the harvest will be desirable in the coming years.

The goal of monitoring efforts in the long term is to determine population trends in each management unit. Annual monitoring activities would be conducted to determine the status of each species in the various units and the appropriate bag limit regime selected on the basis of that information.

Anecdotal information and the few studies that have been undertaken in recent years suggest that sharp-tailed grouse are less abundant than desirable in many areas. Significant numbers of sharp-tailed grouse may still be found in southwestern Manitoba, but they appear to be in localized pockets. These population segments are particularly vulnerable to both predation and over hunting. Hunting activity in these

areas will have to be monitored carefully, and harvest strategies designed to protect localized populations from over harvest.

The harvest of sharp-tailed grouse can be assessed through hunter questionnaires and improved analysis of hunter bag checks made by natural resource officers. Also, the Manitoba Wildlife Federation has indicated a willingness to cooperate in a joint effort to collect one wing from each sharp-tailed grouse shot by hunters. The "wing barrel" approach used in Saskatchewan and other jurisdictions could be a useful approach, with hunters depositing one wing from each upland game bird in strategically located barrels. (one barrel provided for wings at each location, along with a trash barrel) Wildlife Federation members would be responsible for collecting and storing the wings for later analysis. Another approach is to provide a workshop for upland game bird hunters who were interested in collecting data from their own hunting trips. They could be trained to identify male from female and juvenile from adult. These data could be incorporated into a central data base and provide insight into the harvest in those Game Hunting Areas where cooperators were active.

Habitat Management

The loss of upland nesting habitat as more land is brought under cultivation has contributed to the decline of both waterfowl and sharp-tailed grouse in southwestern Manitoba. Drought and over-grazing have also had a negative effect on much of the remaining habitat. In parts of the Interlake, forest succession has decreased the attractiveness of many areas for sharp-tailed grouse. Grasslands in several Interlake WMA's have been encroached on by woody growth, making them more attractive for

ruffed grouse, but less so for sharp-tailed grouse. In the Westlake area repeated spring fires eliminate nesting cover in the short term, and have long term negative effects. The thin soil layer is destroyed, leaving only the highly mineralized parent material. This promotes aspen suckering, rather than the grasses favoured by sharp-tailed grouse for nesting.

The nesting cover that will be developed under the auspices of the North American Waterfowl Management Plan (NAWMP) holds great promise for upland game birds as well. Within the target townships for this plan, sharp-tailed grouse will be able to increase in response to improved habitat conditions. Because a great deal of sharp-tailed grouse habitat lies outside of the target townships for the NAWMP, it would also be desirable to develop a complementary program that would offer incentives for farmers to enhance sharp-tailed grouse habitat outside of those areas targeted by the NAWMP. Changing land use practices over wide areas that have a good potential for sharp-tailed grouse is the most desirable means of increasing populations.

In the northern Interlake extensive wildfires in recent years have set back natural succession and improved the quality of the habitat for sharp-tailed grouse. Large tracts of Crown lands exist here and elsewhere (PFRA pastures, W.M.A.'s etc.) that are producing sharp-tailed grouse, but habitat on these lands could be enhanced on appropriate sites. Care must be taken not to negatively affect other species, such as white-tailed deer, which may require winter cover on these lands.

High Quality Grouse Management Areas should be identified in appropriate areas where the habitat would be managed more intensely for grouse. These areas may consist of Wildlife Management Areas, such as those at Langruth and Narcisse, but they may also include private lands and Community Pastures, with the cooperation of PFRA

and the pasture manager. A more detailed program outline is required to establish priority areas, identify sources of funding, and determine staffing requirements.

Harvest Strategy

Sharp-tailed grouse were the most abundant grouse species harvested by Manitoba hunters until the early 1970's. Thereafter ruffed grouse replaced sharp-tailed grouse as Manitoba's number one upland game bird in hunters' bags. In the mid 1970's, the number of ruffed grouse in the total bag doubled while sharp-tailed grouse showed a gradual decline. In the 1980's sharp-tailed grouse continued to decline in number in most southern habitats and over-harvest of localized population segments in agro-Manitoba is now a concern.

Regulations that require hunters to obtain permission prior to hunting on private land may have afforded greater protection to birds on private lands, but have focused intensive hunting pressure on Wildlife Management Areas and other Crown lands. The Broomhill WMA, for example, was acquired to protect sharp-tailed grouse habitat, but in recent years, they are seldom observed on the WMA in the fall. It may be that intensive hunting pressure has contributed to the decline of sharp-tailed grouse here, but it could very well prove that changes in the quality of the habitat are also contributing factors.

Pre-hunting season mortality of sharp-tailed grouse adults and young is largely the result of predation. The red fox, great horned owl, striped skunk, goshawk, gyrfalcon and cooper's hawk are only a few of the predators that sharp-tailed grouse must contend with. Habitat is essential but it alone does not assure that grouse

populations can survive predation and excessive hunting pressure. To increase grouse numbers, a variety of means have to be employed to increase nesting success. This will in turn drive future populations.

Efforts will be made to restore sharp-tailed grouse populations in those areas where numbers have declined. Bag limits will be reduced where hunting is believed to be a factor in suppressing local population segments. Restrictions on hunting will not be effective where other environmental factors are responsible for limiting population growth. In the Interlake and Westlake areas, habitat enhancement will be required in several WMA's through better fire management and some mechanical clearing. In these areas, the quality of the habitat is believed to be the most significant factor affecting the abundance of sharp-tailed grouse.

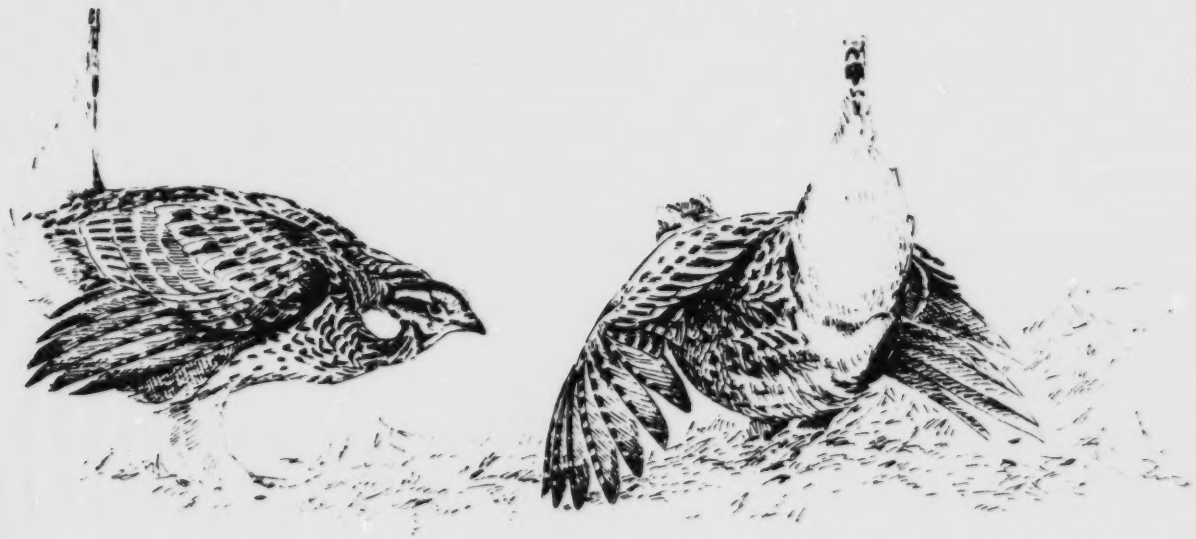
Viewing and Interpretation Strategy

The spring display of sharp-tailed grouse on their dancing grounds has the potential for attracting considerable public interest. Like the snakes of Narcisse, a major site for viewing sharp-tailed grouse could prove to be a popular attraction, even though the event is restricted to the early mornings in spring and late fall. The identification of potential sites to view these birds without causing abandonment will be pursued through the Watchable Wildlife Program.

An extension program aimed at landowners would benefit not only sharp-tailed grouse, but other wildlife as well. Landowners who wished to increase the attractiveness of their lands for sharp-tailed grouse could use simple management techniques on their own. Controlled burns, mowing lek sites, mechanical clearing and

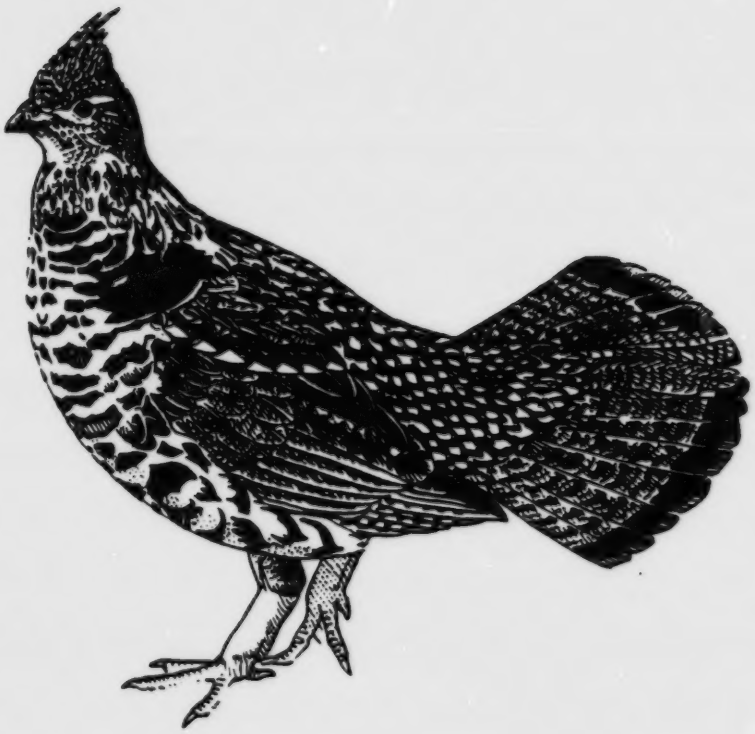
simple improvements such as providing a source of grit away from heavily travelled gravel roads could be used where appropriate.

A Sharp-tailed Grouse Society, similar to the one in Minnesota, would be a useful organization to focus cooperative management efforts in aid of sharp-tailed grouse. The Department of Natural Resources could encourage the formation of such an organization, and if necessary, pursue initial funding through the Special Conservation Fund. A society could help fund research projects, habitat improvement efforts and promote land use practices that favour sharp-tailed grouse.



Ruffed Grouse

(*Bonasa umbellus*)



Ruffed grouse occur throughout the province's aspen parkland and boreal forest. There are red and gray colour phases of ruffed grouse found in Manitoba, but the gray phase tends to be more common. The distribution of ruffed grouse can be directly related to the occurrence of aspen, which provides almost everything ruffed grouse need to exist.

Ruffed grouse can survive on aspen buds alone as adults, but insects are important for chicks. Ruffed grouse feed on a variety of fruits, buds, catkins, and leaves. In eastern Canada and the United States they can cause crop damage in orchards adjoining woodlots, but few problems are experienced in Manitoba. Ruffed grouse seldom, if ever, venture into agricultural crops, though they will feed on clover or alfalfa growing immediately adjacent to forest cover. Food does not appear to be a major factor limiting their numbers where aspen is abundant.[4]

Ruffed grouse are well camouflaged to remain inconspicuous to predators. They have to be ever vigilant as great horned owls, goshawks, gyrfalcons, and coopers hawks hunt them from the air. On the ground, they must avoid coyotes and foxes, and use their camouflage to conceal their nests from skunks, raccoons, and other predators. The only departure from their strategy of blending with their surroundings is during the spring when males must make their presence known for breeding purposes. They find a small clearing and often use a prominent log as a stage for their performances. They beat their wings, producing a rapid thumping or drumming noise to attract a female. In most years males begin displaying for females early in the spring, but the peak activity usually occurs between mid May and the first of June. Male ruffed grouse are particularly vulnerable to predators on their way to and from drumming logs, as well as on the drumming site itself.

Female ruffed grouse build nests at the base of trees, laying an average of 11 eggs. During incubation the hen seldom leaves the nest and when she does it is for only a brief period. The peak of the hatch usually occurs in mid June. If the first nest is destroyed by predators, the hen may attempt to renest, but if the brood is lost she will not initiate another nest. Brood rearing habitat consists of forest openings and brushy

edges where insects may be found near escape cover.

Ruffed grouse populations tend to follow a ten year cycle of abundance to scarcity, but the reasons for this regular trend are not fully understood. While predators may have a significant effect on grouse populations, attempts at widespread reduction of predators are seldom effective or desirable.

Population Goals and Monitoring

In remote areas ruffed grouse can be difficult to monitor due to the inaccessibility of much of their habitat. Drumming counts along roadside transects in the spring are the most efficient means of determining population trends in the most popular hunting areas.

Hunter questionnaires are the best available means for estimating the number of hunters, the extent of the harvest, and other relevant information. Also, natural resource officers will be encouraged to collect data on the age and sex of ruffed grouse in hunters' bags. Should a wing barrel program be developed in cooperation with the Manitoba Wildlife Federation for sharp-tailed grouse, provisions should be made to collect ruffed grouse tail fans and wings as well. The other option for data collection, cooperating hunters trained to record the age and sex of the birds they harvest, could also be used to monitor the harvest of ruffed grouse in various Game Hunting Areas.

Habitat Management

A large portion of the ruffed grouse population in Manitoba is found on public lands, including provincial forests, un-designated Crown lands, provincial parks, and wildlife management areas. Considerable numbers also exist in private woodlots in the aspen parkland.

In forested areas, rotational cuts of two to eight hectares in size benefit ruffed grouse. This provides the optimum amount of edge cover and will increase the numbers of grouse. Large clear-cuts can eliminate grouse habitat for many years and should be avoided. The use of herbicides in forested areas to eliminate hardwoods and favour conifers also has a negative impact on grouse. Similarly, reforestation efforts aimed at producing solid stands of a single species have little value for grouse. In addition, large scale applications of pesticides to control forest insects will have unfavourable consequences for grouse.

The Ruffed Grouse Society could play a helpful role in specific projects and in monitoring forestry operations, but presently ruffed grouse populations are doing well in most areas without intensive habitat management. Small scale projects to improve viewing opportunities or enhance habitat on private lands in the aspen parkland would be a helpful contribution by this organization. Potential also exists for cooperation with the Forestry Branch in promoting the management of small woodlots in a manner that would provide fuel wood and additional income, while enhancing ruffed grouse habitat.

Harvest Strategy

Ruffed grouse populations can withstand considerable hunting pressure provided that adjacent habitat harbours birds to repopulate the area hunted. Heavily hunted areas can be sustained by immigration from other areas that are lightly hunted or unhunted. Ruffed grouse can be over harvested in readily accessible areas if breeding stock is not maintained nearby.[5]

Ruffed grouse populations are controlled by predation, habitat quality, environmental factors and to some extent, hunting. Recent studies have indicated that excessive hunting pressure can suppress ruffed grouse populations in even the best habitat.[6]

The greatest hunting effort takes place as soon as most trees and shrubs have dropped their leaves, but before harsh weather sets in at the end of October. Interest tends to diminish as the season progresses and birds become warier. It is believed that very little of Manitoba's ruffed grouse habitat experiences sufficient hunting pressure to significantly affect population levels.

Most hunting activity occurs close to roads and trails. Areas that serve as defacto refuges (due to inaccessibility) which allow replacement birds to filter back into shot out areas, appear to be adequate.

Access is the single most important factor affecting grouse kill, and as new roads are built into previously inaccessible areas, over-harvest may become a concern. As former refuges by remoteness become accessible, other means of controlling the harvest may have to be employed.

Viewing and Interpretation Strategy

Ruffed grouse are commonly found near campgrounds, cottage subdivisions and along roads or walking trails in many parks. A publication dealing with ruffed grouse would be more effective than the development of a single purpose facility intended for ruffed grouse viewing. Aspects of ruffed grouse management can be integrated into existing programs, such as the Manitoba Forestry Association's forest centres and other similar facilities.

Spruce Grouse

(*Canachites canadensis*)

Spruce grouse are widely distributed in Manitoba's coniferous forests. They are found where there are spruce, jack pine, balsam fir and tamarack, but seem to prefer a mixture of jack pine with scattered spruce.

Males defend territories in the spring for breeding purposes, but may mate with more than one female. They display on the ground in a small clearing and make occasional noisy flights to a nearby branch. They beat their wings somewhat like ruffed grouse, but the drumming noise they make is softer and of a much shorter duration.

Females space themselves out for nesting purposes and tend to avoid each other, occupying territories distinct from the males. They nest on the ground, usually beneath a conifer, and are well camouflaged to blend with their surroundings. Hens keep to the nest during incubation, moving little if at all for hours on end. They will leave the nest only three or four times during the course of the day, feeding for 10 - 20 minutes in the early morning and late evening. Clutch sizes range from five to seven eggs. The peak of the hatch usually occurs in mid June, although it may be later farther north. Chicks are able to fly when only a week of age, but they have little stamina and cannot make repeated flights.

Spruce grouse are trusting birds, sometimes called "fool hens" for this reason. They are susceptible to considerable predation by goshawks, great horned owls, fishers, red foxes and others. They are adversely affected by pesticide use, and unfavourable forest management practices can significantly reduce their numbers.

Spruce grouse numbers tend to be controlled by forest harvesting operations and predation. Nest predation keeps their numbers low and relatively constant, with significant annual mortality. As with ruffed grouse, efforts to reduce predators over a wide area would be largely ineffective in increasing spruce grouse. Management of habitat tends to be the only effective means of maintaining the population.

Population Goals and Monitoring

Population surveys are difficult due to the nature of spruce grouse habitat in Manitoba, and little data has been collected over the years. The first step will be improved data on hunter harvest and effort through a questionnaire, and a cooperative harvest monitoring program.

Monitoring in readily accessible areas, particularly those under intensive forest management, will be desirable in future. A special study that will establish a statistically accurate method for assessing the status of spruce grouse populations in Manitoba would be desirable.

Habitat Management

Habitat changes brought about by extensive logging, large wild fires and forest monoculture have a negative effect on spruce grouse. Forest management practices that reduce plant diversity are also detrimental to spruce grouse. Further, chemicals used in the control of forest pests can destroy non-target insect food critical to brood survival.

Extensive wildfires, such as those in the Porcupine Hills, Wallace Lake, Manigotagan, G.H.A. 21, and Nopiming Provincial Park, reduce spruce grouse habitat for long periods of time. The 1980's were a decade of wildfire in Manitoba, and the consequences for spruce grouse have not been fully determined.

Harvest Strategy

Manitoba hunters currently harvest spruce grouse incidentally to hunting ruffed grouse, usually along trails or access roads. An undetermined number are also taken by subsistence users and trappers. They have largely been protected from excessive hunting by the inaccessibility of much of their habitat. However, those populations in the Sandilands Provincial Forest, Whiteshell Provincial Park, and in the vicinity of The Pas, Grand Rapids, Lynn Lake, Thompson, Snow Lake, and Gillam are readily accessible to hunters and are subjected to significant hunting activity.

Manitoba's spruce grouse range is largely inaccessible, but increased service road construction associated with logging, mineral extraction, tourism and hydro developments could have an impact in future. Should greater accessibility result in excessive harvest of spruce grouse, a hunter education program combined with selective restrictions for spruce grouse may be required in future.

Viewing and Interpretation Strategy

Spruce grouse are easily observed in many parks in the boreal forest and with proper protection, there is potential for developing related viewing opportunities. Informational programs developed for ruffed grouse should deal with spruce grouse as well.

Willow Ptarmigan

(*Lagopus lagopus*)

Northern Manitoba is home to willow ptarmigan, distinguished from rock ptarmigan by their heavier bills and slightly different plumage. Rock ptarmigan have a dark-tipped tail in all seasons, while willow ptarmigan have a white-tipped tail. Both species are well camouflaged in summer, and their mottled brown plumage is entirely replaced in winter with snow-white feathers. Unlike rock ptarmigan which retain their

winter plumage into the breeding season, male willow ptarmigan are resplendent in their half golden-brown half white appearance.

Willow ptarmigan breed amongst the willow and dwarf birch shrubs on the tundra of Manitoba's Hudson Bay lowlands. They prefer clumps of shrubs interspersed with grasses, sedges, mosses and forbs. Their food consists primarily of willow buds and twig tips, dwarf birch buds and catkins, as well as blueberries and other berries that may be available.

The tundra has few nest predators, allowing willow ptarmigan to nest nearer each other than those grouse which lose a larger proportion of their nests to mammalian predators. Willow ptarmigan females, therefore, search relatively small pre-laying ranges for nest sites. The small space requirements of females allows males to economically defend specific territories. It is the best available nesting sites (cover and space) that females seek, and the fitness of a male is determined by the quality of the nesting resources he controls. Females select conspicuous, vigilant males in a prolonged pair bond. These males reduce predation by luring predators away during nest searching and egg-laying, and later during brood rearing.[7]

Male ptarmigan establish territories in the spring and display on slightly elevated hummocks to attract a female. The break up of the winter flock and the redistribution of the males on specific territories occurs virtually overnight. The rapidity with which territorial behaviour is exhibited and pair bonds are formed suggests that older males return to territories they have occupied in the past, rejoined in some instances by their mate from the year before. At Cape Churchill, males prefer to make territorial vocalizations from high willow ridges bordering the larger lakes. Frequent calling and brief aerial displays are used to proclaim their territory. They mate with

only one female in a given year, and participate in brood rearing. Nests are built in clumps of grasses, under bushes or near some other form of concealment, usually at the periphery of the male's territory.[8] The hen lays seven to ten eggs, and may renest if the first clutch is destroyed by predators. Nesting success is usually high, with over 90% of the eggs hatching successfully. Brood rearing occurs near the nesting site within the pair's territory, where open areas occur near escape cover. Ptarmigan chicks are less insectivorous than other species of grouse and vegetation makes up the bulk of their diet.

Willow ptarmigan form flocks, use snow roosts, move to taller escape cover, and feed briefly at dusk and dawn to minimize the threat posed by predators. Most willow ptarmigan in Manitoba leave their breeding territories near the Hudson Bay coast and move south to better cover along the edge of the tree line. They seek willow thickets along streams and rivers and other areas with tall shrubs, often found well south of the tree line in muskegs, lake and river edges and forest openings.

Population Goals and Monitoring

Willow ptarmigan exhibit considerable fluctuations in numbers from year to year. Breeding densities in good habitat can vary from less than one pair per square kilometre to more than five per square kilometre. The inaccessibility of much of their habitat makes population monitoring on a broad scale impractical. Trend data can be collected in key areas and will provide an indication of their status on an annual basis.

Habitat Management

Willow ptarmigan habitat remains largely intact in Manitoba, with much of it inaccessible. Large tracts of suitable cover have been set aside in Cape Churchill and Cape Tatnum Wildlife Management Areas, so this habitat is relatively secure in the long term.

Harvest Strategy

Willow ptarmigan are important for some subsistence users and a few recreational hunters. They are taken by waterfowl hunters and local residents when opportunities arise. To date, bag limits and season lengths have varied little over the years and populations have fluctuated independently from hunting activity. Given the present level of subsistence and recreational hunting, willow ptarmigan populations are secure. The only exceptions are in those areas where localized hunting pressure near major settlements may deplete the resident stock. These situations should be addressed on a case by case basis where additional management efforts may be required.

Viewing and Interpretation Strategy

Incidental to polar bear viewing excursions or other wildlife related tours, ptarmigan will enhance the visitor's experience in this area. Many European tourists may recognise this bird as it is circumpolar in distribution. Anyone who is familiar with the Scottish moors will know the willow ptarmigan as the Scottish red grouse, while a German visitor would call it a moorscheehuhn. For some it may be an interesting link with their own country.

Rock Ptarmigan

(*Lagopus mutus*)

Rock ptarmigan are not known to breed in Manitoba, but they spend their winters on the Hudson Bay lowlands in the province. Their summer home is the high Arctic, ranging to the northernmost reaches of the Northwest Territories, but they migrate a significant distance southward in the fall. Both males and females have blackish tails throughout the year and their brown plumage is replaced with white in winter. In their winter plumage the males have a black streak connecting the bill with the eye. Some, but not all, females have this black line as well.

Rock ptarmigan breed on moderately sloping ground in the rocky desert-like habitat of the high Arctic. Some shrubs occur in ravines or other protected slopes, while sedges and lichens may be abundant on suitable sites. Their diet is similar to that of willow ptarmigan, with berry producing shrubs, willow buds and dwarf birch catkins making up the bulk of their food.

In the spring males display on rocks or small elevations to attract females and actively defend their territories. Nests are built in areas that are more open than the nesting cover used by willow ptarmigan, but they will take advantage of any overhead concealment that may be available. Clutch sizes vary between seven to ten eggs, and renesting may occur if the first effort is lost to predators. Brood rearing habitat is found within the nesting territory and broods are most often found in fairly open country.

Rock ptarmigan form large flocks in the fall and move south to areas that are used in summer as breeding habitat by willow ptarmigan. Little if any direct competition for food exists between the two species as rock ptarmigan tend to arrive after the willow ptarmigan have left for the winter, and depart for the high Arctic before willow ptarmigan arrive to stake out their breeding territories in the spring.

Population Goals and Monitoring

Breeding and wintering habitat for this species remains largely intact. The remoteness of these areas makes accurate population estimates difficult to obtain, but trend data can be acquired in known wintering areas.

Habitat Management

Nesting habitat in the Northwest Territories appears to be secure, while extensive wintering areas exist within the Cape Churchill and Cape Tatnum Wildlife Management Areas. Large scale alteration of this habitat seems unlikely in the foreseeable future.

Harvest Strategy

Rock ptarmigan are difficult for subsistence and recreational hunters to distinguish from willow ptarmigan. Consequently, hunting seasons and bag limits do not treat these species separately and there does not appear to be a need to alter this approach. Both willow and rock ptarmigan populations tend to fluctuate irrespective of the present hunting regime, and populations appear to be capable of maintaining the present level of sport and subsistence harvest. Any localized concerns about the depletion of a specific population segment in the vicinity of a major settlement may be dealt with on a case by case basis.

Viewing and Interpretation Strategy

Most visitors to the Churchill area plan their trip for the optimum polar bear or beluga whale watching opportunities. Rock ptarmigan are seldom seen in Manitoba at these times so there is limited potential for promoting viewing of these birds. Rock ptarmigan are worthy of mention, however, in informational materials intended for general distribution.

33

Greater Prairie Chicken

(*Tympanuchus cupido*)

Greater prairie chicken first appeared in Manitoba in significant numbers in the 1880's. They expanded their range northward from the United States into the extensive grasslands of southern Manitoba soon after the once vast bison herds disappeared. Greater prairie chickens found a ready source of food in the small fields established by the first settlers, and favourable conditions set the stage for a rapid expansion by this species.

The number of greater prairie chicken appears to have peaked in the early 1900's. Grasslands were increasingly ploughed under or grazed by livestock, and predators became more numerous. Some believe that the use of arsenic-based pesticides used to control grasshoppers at the time may have contributed to their decline as well.[9] In the late 1940's, the few remaining prairie chicken hybridized with sharp-tailed grouse and all but disappeared from Manitoba. There have been no confirmed sightings of greater prairie chicken in the province since the mid-1950's when a small flock near St. Ambroise disappeared.

Prairie chicken feed on insects, seeds, and cereal grains. Like sharp-tailed grouse, they establish leks or "booming grounds" for breeding purposes in the spring. This can lead to hybridization with sharp-tailed grouse in areas where both species exist, and sharp-tailed grouse eventually come to dominate.[10] In the 1980's greater prairie chicken occurred only in isolated pockets in Minnesota, Wisconsin, Illinois, South Dakota, Nebraska, Colorado, and Kansas. Attempts at reintroduction have been made in other jurisdictions, but these have largely failed.

In 1979, members of the Transcona Game and Fish Association imported 14 adult greater prairie chicken from a captive flock in Jamestown, North Dakota. These birds were held over the winter at a private residence, and they produced 80 young. There was a reported 80% hatching rate and only 10% loss of the chicks. Due to crowding in the pens, cannibalism and other factors, most of the young perished along with several adults. Only six birds survived for release into the wild, and it is unknown where the release took place.

A study investigating the feasibility of reintroducing prairie chicken into Manitoba was completed in 1987.[11] It recommended against a single purpose program to restore the greater prairie chicken to Manitoba, but suggested that the reintroduction should go hand in hand with the implementation of a grassland restoration program. Release sites would have to be selected that have suitable habitat, with few if any sharp-tailed grouse nearby. Some removal of sharp-tailed grouse may be necessary, possibly given to a cooperating state in return for providing greater prairie chicken.

In 1990 it was decided that the greater prairie chicken would no longer be listed by COSEWIC as an endangered species in Canada, but as an extirpated species. Although reintroduction of greater prairie chicken has not been ruled out, higher priority will be given to those threatened and endangered species that still persist in wild populations in Canada. Saskatchewan has taken the lead role in preparing a recovery plan for greater prairie chicken, and any future action will be based on the recommendations outlined in this plan.

Population Goals and Monitoring

It is very unlikely that even with additional habitat acquisition that a population capable of supporting a hunting season could be successfully established. Greater prairie chicken could be reintroduced as a "non-game" bird strictly for viewing purposes, but other species will receive a higher priority.

The reintroduction of greater prairie chicken is only feasible with the cooperation of non-governmental organizations such as the Manitoba Naturalists Society,

Natural Resource Institute, and the Manitoba Wildlife Federation. Funding for such an initiative should be exclusively from sources outside the Wildlife Branch, such as the Endangered Species Recovery Fund or the Special Conservation Fund.

Release sites would later be investigated to identify the location of leks and counts made annually. Monitoring activities would be undertaken cooperatively with the other organizations sponsoring the releases.

Habitat Management

Reintroduction of greater prairie chicken as part of a grasslands restoration and enhancement program could be undertaken in the southeast and southwest management units. Possible locations for reintroduction would be the Oak Hammock Wildlife Management Area, the Lake Francis area of Delta Marsh, and grasslands near Tolstoi. Intensive habitat management would be required prior to any releases.

Presently, the Oak Hammock Marsh Wildlife Management Area has the best potential as a release site for several reasons. Greater prairie chicken can be confused with sharp-tailed grouse and gray partridge when they flush, so release sites should be chosen where little upland game bird hunting traditionally occurs. Oak Hammock is already a popular site for viewing wildlife, and its controlled hunting program will ensure adequate protection for greater prairie chicken. A large portion of the area is a game bird refuge, and little upland game bird hunting takes place in the managed hunting area. If necessary, the managed hunting area could be closed to all upland game bird hunting without causing any concern to waterfowl hunters.

Harvest Strategy

It is very unlikely that reintroduction of greater prairie chicken would result in a huntable population. It is most probable that a small population may exist strictly as a non-game species, through intensive habitat management.

Viewing and Interpretation Strategy

Reintroduction of greater prairie chicken could be a means of promoting the conservation of native grasslands and celebrate those successes that have been achieved. The Brennan property at Oak Hammock and other lands previously acquired for the WMA would be desirable reintroduction sites as viewing and interpretation facilities in this area will attract significant numbers of visitors. Similarly, the restoration of tall grass prairie in Beaudry Provincial Park could be better promoted through the release of greater prairie chicken at an appropriate time.

Part II

Exotic Game Birds

Gray Partridge

(*Perdix perdix*)

Gray partridge, also known as Hungarian partridge, are small European game birds introduced into south-central Manitoba in 1924. Their range and numbers increased rapidly and the first hunting season was held in 1931. They are the most successful exotic game bird introduced to the prairie provinces.

Manitoba's gray partridge population fluctuates considerably from year to year. The size of the population each fall is related to predation, habitat conditions and pesticide use. These factors affect hatching success and chick survival, particularly in the first month of their lives.

Gray partridge are one of the few non-native game birds that can survive Manitoba's winters and persist in cultivated areas. Consequently, their range in Manitoba appears to be expanding. Although they live in close proximity to agricultural fields, their preference for weed seeds minimizes their impact on farming operations.

Gray partridge begin nesting in the last two weeks in May, laying up to 20 eggs in their first attempt and up to 12 if a second effort is necessary due to nest predation. The availability of insects immediately after hatching is critical to the survival of chicks. Chick mortality can be significant when insects are unavailable, making this a key factor in determining fall populations.

The use of pesticides can have serious effects on gray partridge, causing death through poisoning or eliminating insects as a source of food. Predators such as the snowy owl, great horned owl, marsh harrier, red-tailed hawk, short-eared owl, red fox, striped skunk and raccoon also take their toll. Ice storms and late winter rains may contribute to mortality in some years, by making their food supply inaccessible. A gray partridge covey will dig a shallow depression in the snow to escape the wind and conserve body warmth, but many succumb to exposure every winter. Severe winters greatly reduce their numbers, but their high reproductive capability results in a rapid recovery under more favourable conditions.

Population Goals and Monitoring

An annual census can be undertaken to identify population trends. Gray partridge are readily observable during December and January, provided that adequate snow cover exists. In years when snow cover is sparse, winter transects provide little useful data.[12] New techniques for determining populations are being developed in North Dakota and Alberta that may hold more promise for monitoring in future.[13]

Habitat Management

Most gray partridge habitat occurs on private land, though key parcels of public lands are also of importance. With only slight modifications to maintenance procedures, undeveloped road allowances and other right-of-ways can accommodate most of their habitat needs. Gray partridge are adversely affected by cultivation of grassed roadsides and incorporation of former farmsteads into fields. The removal of headlands and fence lines followed by cultivation also eliminates vital habitat. Soil erosion further compounds these problems by filling ditches and drifting over grass strips. Seasonal habitat loss may also occur when grassed areas are burned or herbicides are applied to roadsides and field edges.

Gray partridge habitat management is consistent with sound soil and water conservation practices. This includes planting shelterbelts, maintaining grass cover on road allowances, discouraging herbicide and pesticide spraying along road ways, as well as avoiding spring burning and mowing. If mowing is necessary, it should not be done

prior to July 15. Farmers should be encouraged to leave a five to ten meter grass strip unmowed and unsprayed around the edge of fields and seed grass cover on waterways and erosion prone areas. Multiple row shelterbelts or single row shelterbelts with adjacent grass strips are also desirable, and the use of zero-tillage techniques provides winter cover. Leaving a five to eight meter strip of crop at the edge of the field unsprayed has also been found to be beneficial as the weeds produced in this strip have greater insect populations. This leads to improved survival of the young birds. When transporting grain, farmers should cover the boxes of grain trucks to avoid spillage on roads. This attractive food source lures partridge onto roadways and leads to vehicle collisions.

Harvest Strategy

The gray partridge population seems little affected by the present level of hunting activity. Hunter success is largely related to the natural fluctuations in gray partridge populations, and the available harvest estimates reflect this. In 1965, for example, approximately 2,200 were harvested, while there were an estimated 16,500 taken in 1970 and 10,000 in 1975.

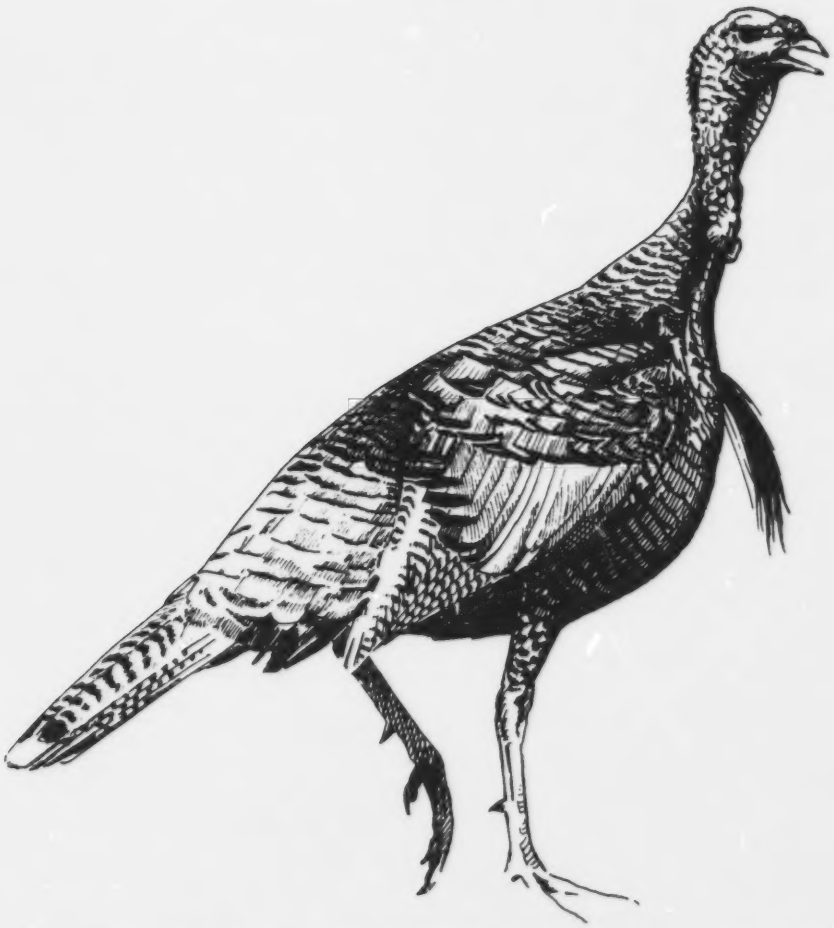
When they are abundant, gray partridge provide excellent hunting, but few Manitoba hunters make trips specifically for hunting this species. The harvest is largely incidental to waterfowl or sharp-tailed grouse hunting. There is little public land in areas of high gray partridge numbers, so hunting this species will largely depend upon the goodwill hunters establish and maintain with private landowners.

Viewing and Interpretation Strategy

Gray partridge viewing opportunities tend to be fairly localized. They are welcome winter visitors to many farmsteads and often occur along railway rights-of-way within towns and cities. An informational brochure is likely sufficient for most outdoor enthusiasts, while a more detailed habitat guide for landowners is desirable.

Wild Turkey

(*Meleagris gallopavo*)



Wild turkeys were introduced in the 1950's by several game and fish clubs. Both Wild Gobblers Unlimited and the Bronze Turkey Club continue to stock birds annually. By 1965 the provincial wild turkey population had grown to 2000 birds, most of which were found in the Pembina River Valley near LaRiviere. This area has oak forests mixed with agricultural crops which provides suitable food and cover for wild turkeys. Annual spring hunting seasons for male turkeys have been held since 1980.

Manitoba is a marginal habitat for wild turkeys as deep snow buries food supplies and the extreme cold places considerable stress on these birds. Most wild turkeys congregate in farmyards and cattle feedlots and are dependent on farmers for several months each winter. Without the care of many concerned farmers, few of these birds would survive the winter.

Significant numbers of adults and young are lost to great horned owls, coyotes and red foxes, while striped skunks and raccoons feed on the eggs. Nest success must be high in order for turkeys to increase in number, and predation can thwart those efforts. Predator control is not desirable, as predators can remove the weak or sick birds from the population and limit the spread of disease.

Mixing with domestic turkeys can occur, raising concerns regarding possible spread of disease. Milk producers are not permitted to raise domestic turkeys due to the risk of disease transmission from the turkeys to milk. The presence of wild turkeys has caused problems for some milk producers when Public Health Inspectors have observed them in the vicinity of the farmyard.

A major threat to existing wild turkey populations is blackhead disease (*Histomonas meleagridis*), also known as enterohepatitis. It can be carried by other birds that act as hosts, such as pheasants, which are not killed by the disease themselves. To prevent the spread of blackhead, contact between wild and tame flocks should be avoided. Winter feeding sites, and baiting locations for relocation purposes should be rotated to minimize the risk of this disease. Further releases of wild turkeys should be from existing wild stock, rather than game farm birds, and release sites will be subject to prior approval by the Wildlife Branch on the advice of the Regional Wildlife Manager. Releases in other jurisdictions have shown that releases of game farm birds often fail

due to disease and predation, while great success has been achieved by capturing and relocating wild birds.

Population Goals and Monitoring

Turkey populations are easily monitored by counting "feedlot" birds between January and March. Continuing winter mortality tends to bias these counts to the high side, but they do serve as a good indicator of trends.

In the spring of 1991, there was an estimated population of 3,000 wild turkeys in Manitoba. The minimum target level for the size of the fall population is 2,000 birds, while the optimum target size is 3,500. The maximum target population is 5,000 birds, but could be exceeded given improved habitat management and supplemental feeding.

As an exotic species that is marginal in Manitoba, it would be appropriate for this species to be managed and monitored in cooperation with the organizations interested in releasing these birds. The Special Conservation Fund and other sources from outside the Wildlife Branch should be utilized for these purposes.

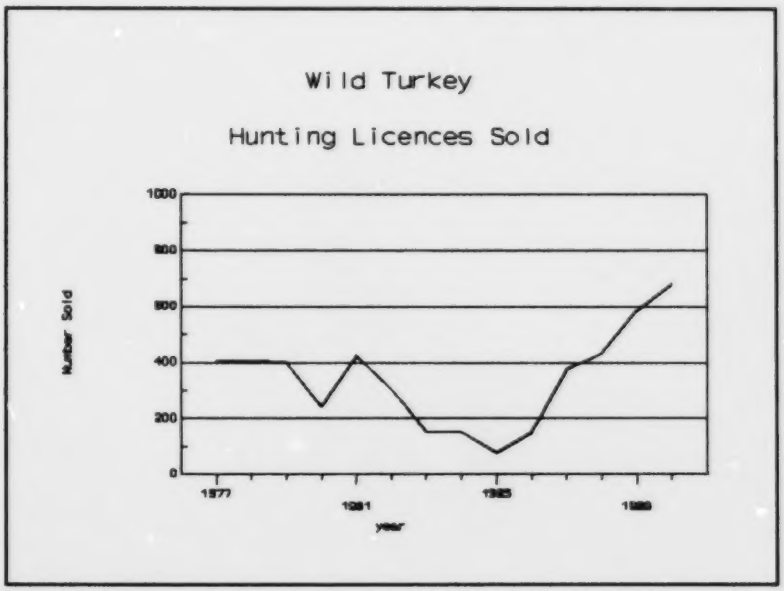
Habitat Management

The enthusiasm for wild turkeys amongst various individuals and wildlife groups should be redirected in part towards habitat securement and enhancement. This will increase the likelihood of turkeys surviving and benefit other species of wildlife as well. Should wildlife groups acquire lands for turkey management purposes, there will be spin-off benefits for white-tailed deer and other wildlife.

Harvest Strategy

Spring hunting of wild turkeys provides off-season recreation but demand has not been excessive. Spring hunting of "Toms" within the present harvest regime is possible without negative effects on the population.

Should the maximum population target of 5,000 birds be exceeded, consideration may be given to a limited fall season. Turkeys could be hunted incidentally to other upland game birds, which may create more of an interest in the spring season. Consultations with the cooperating organizations should be undertaken, before any move is made to further liberalize seasons.



Viewing and Interpretation Strategy

The organizations involved in releasing wild turkeys will be encouraged to take a more active role in ongoing management and redirect some of their efforts towards habitat enhancement. Turkeys that are causing problems for milk producers should be live trapped and relocated to other suitable release sites, and new releases should not take place in dairy farming areas. Members of the various clubs could also assist in winter counts and other aspects of management. Viewing of wild turkeys in the Pembina Valley will be promoted through the Watchable Wildlife Program.

49

Pheasant

(*Phasianus colchicus*)

From 1930 to 1958 ring-necked pheasant releases in Manitoba and in the Dakotas resulted in a northern "fringe" population in southwestern Manitoba. Pheasants flourished briefly in the early 1940's because nesting cover was abundant on idled farmland, predator populations were low and there were several mild winters. It wasn't long, however, before severe weather, increased numbers of predators and modern farming practices combined to all but eliminate pheasants from Manitoba. Pheasants

releases in the 1950's proved very disappointing and were discontinued due to the extremely low survival rate of the released birds.

The increased occurrence of corn and sunflower crops in southern Manitoba offers food for pheasants, but their numbers have not responded. Modern corn and sunflower fields are relatively weed free compared with those of the 1940's, so they offer less variety of food for pheasants. Pheasants do not use snow roosts like most native species, making them more vulnerable to winter predation and adverse weather. The absence of suitable winter cover is believed to be the most important factor limiting their numbers.

Private shooting preserves and game farms currently provide pheasants for put-and-take hunting and the restaurant trade. A few wild birds persist in the extreme southwest corner of the province, but their numbers have remained low for many years.

The Manitoba Wildlife Federation has been releasing Bohemian/ring-necked pheasant in various parts of the province since the mid 1980's. Although some birds have survived, little evidence of them subsequently reproducing in the wild has been recorded. Future release sites should be identified in consultation with the Regional Wildlife Manager and be approved by the Director of Wildlife.

Population Goals and Monitoring

Pheasants populations can be estimated in the spring along specified transects by counting the number of cocks calling in the early morning hours. Data are available from transects monitored in the 1950's as part of the pheasant release program

under way at that time, but only anecdotal information is available since then.

Any further releases should be better monitored by the organizations involved to determine their effectiveness.

Habitat Management

Manitoba may always prove to be a marginal habitat for pheasants, even though there are still many optimists in the province that believe a hardier strain can be found or developed. There is tremendous interest and enthusiasm for pheasants amongst many Manitoba hunters and bird fanciers, despite repeated failures to establish wild populations.

If the enthusiasm for pheasants could be harnessed in order to promote habitat enhancement efforts in southwestern Manitoba, some worthwhile spin-off benefits could be realized for indigenous wildlife. Rather than releasing pen-reared birds into inadequate habitat, pheasant groups should be encouraged to make that habitat more attractive for wildlife. The establishment of grassed cover, hedgerows, and food plots for pheasants, along with other conservation farming techniques, even in a put-and-take pheasant hunting situation, will increase the area's carrying capacity for other species.

Harvest Strategy

Pheasants presently exist in small isolated wild populations and on licensed

game farms or shooting preserves. They are raised by individuals for personal use on hobby farms, and by commercial operators for the restaurant trade or shooting preserves. An affiliate of the Manitoba Wildlife Federation has recently been awarded a grant from the Special Conservation Fund to develop its own rearing facilities for pheasants.

There are presently too few wild pheasants to warrant recreational hunting seasons. If releases of pheasants eventually result in a viable wild population, recreational hunting may occur again during an open season. If not, pheasant hunting will still be available on a put-and-take basis on commercial and private shooting preserves.

Viewing and Interpretation Strategy

Efforts should be made to maintain liaison with organizations such as the Manitoba Wildlife Federation and provide information as required. Because certain groups and individuals are willing to spend funds related to pheasants, but cannot be convinced to redirect those funds to other indigenous species, it may be to the branch's advantage to work with these groups to see that pheasant related efforts are steered towards habitat enhancement. Years of failure and the advice of wildlife branch officials to abandon pheasant releases have seemingly left the pheasant advocates undaunted. Instead of continuing to discourage these efforts, the branch should make an attempt to redirect this initiative towards privately funded habitat enhancement with a pheasant release component.

Part III

Approach to

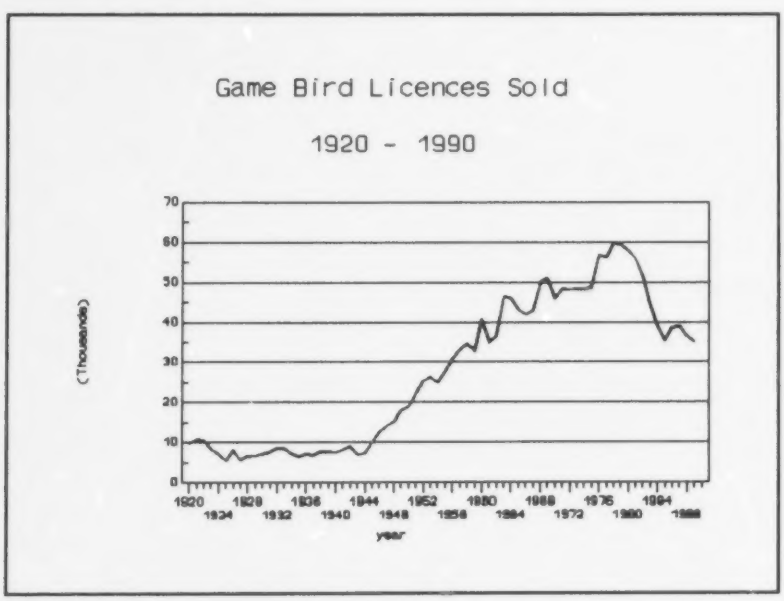
Upland Game Bird Management

Demand for Upland Game Birds

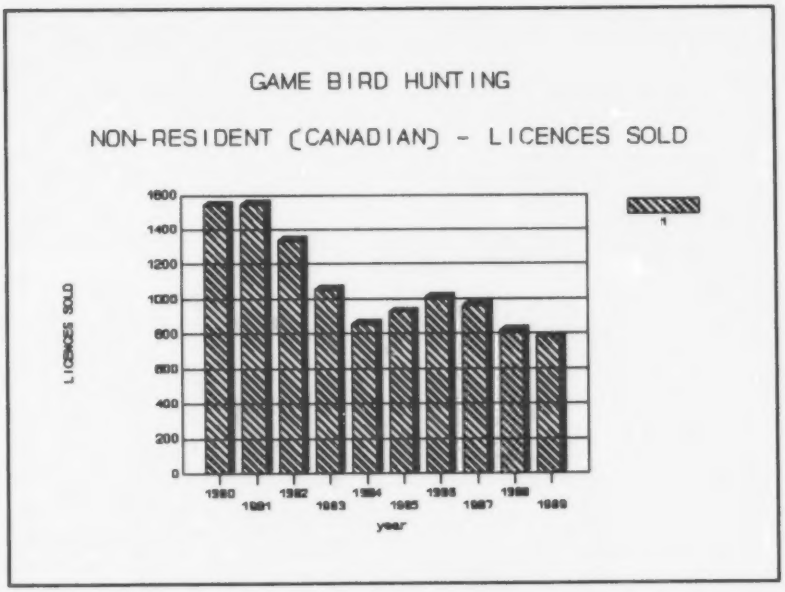
The number of game bird licences sold in Manitoba declined through the 1980's, and remained somewhat stable during the early 1990's. This trend is not unique to Manitoba, as the number of hunters is decreasing across North America. The reasons for this decline are the subject of much speculation and conjecture, but few can agree on any one factor.

Licence sales figures do not differentiate between waterfowl and upland game bird hunters, making it difficult to draw any conclusions regarding upland game bird hunting from this source of information. The collection of additional demographic information on hunters and their preferences would be valuable in projecting demand for upland game birds and allocating the harvest. Information on the anticipated demand for recreational/educational use of upland game birds is expected to come to light as the Watchable Wildlife Program is further developed.

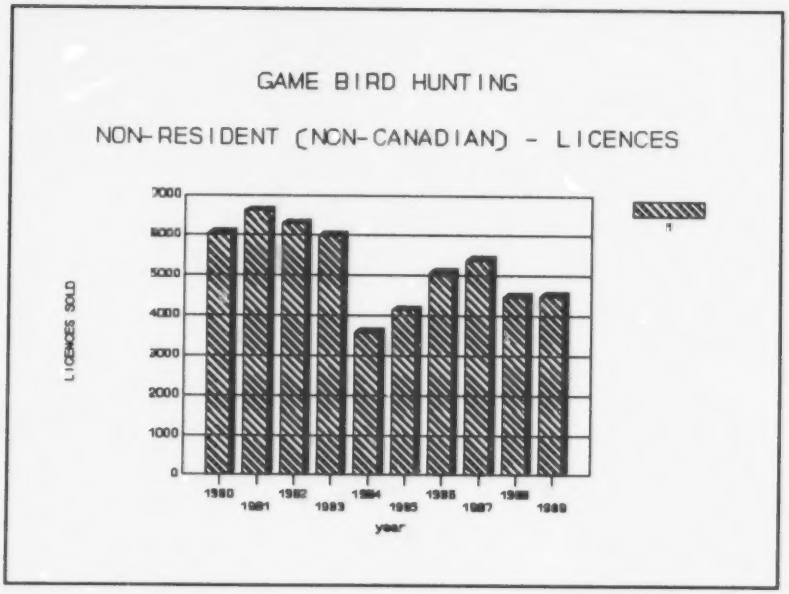
In future game bird licence sales will likely stabilize in the order of 30,000 licences sold annually, of which approximately 5,000 will be non-resident hunters. It is unknown at this time how many hunters will pursue upland game birds, so additional data acquisition is required.



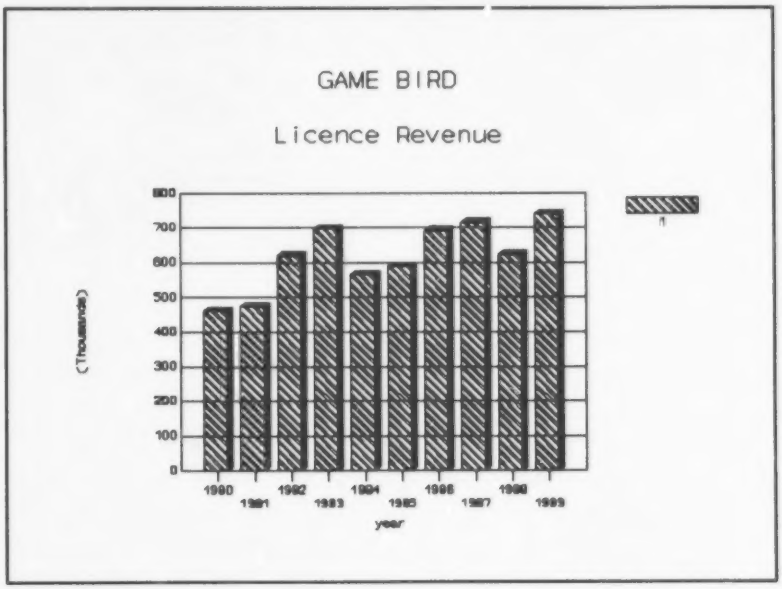
Upland game bird hunting does not attract significant numbers of non-residents of Manitoba who reside in other provinces of Canada. The nearby prairie provinces have sufficient numbers of upland game birds readily available to their residents, while Northern Ontario has ruffed and spruce grouse in abundance.



Residents of the nearby United States do come to Manitoba in significant numbers, usually for a combined waterfowl and upland game bird hunting trip, but a small number do come exclusively for upland game bird hunting. When restrictions were placed on non-resident upland game bird and waterfowl hunting in the early 1980's, the number of non-resident hunters declined dramatically. Although only some relaxation of the restrictions occurred, numbers quickly returned to their former level.



While overall licence sales have declined in recent years, direct revenues have increased because of fee increases. The direct revenue to the province from the sale of game bird licences is in the order of $0.75 million annually, of which $0.45 million is generated through the sale of non-resident licences. A great deal of economic activity related to upland game bird hunting also occurs, but additional data is required in order to quantify the indirect revenues that are generated. Money is often spent by upland game bird hunters in rural areas where other sources of business may be scarce and every dollar spent is important.



Ear-marking of funds through licence sales for such species as wild turkeys or pheasants has been discussed in the past, but this method of directing funds to specific projects is not widely used in Canada. Unless there are government wide changes respecting the ear-marking of funds, this approach will not be used to operate programs related to upland game bird management. Rather, cooperating non-governmental organizations and various grant programs will be used to fund special projects, while on-going management will remain the responsibility of the Wildlife Branch, with funding allocated through the annual departmental estimates process.

Population Monitoring

Population monitoring activities should be conducted annually to determine population trends in each upland game bird management unit. Where possible, the status of each upland game bird species will be determined and harvest strategies implemented accordingly.

Within each management unit where sharp-tailed grouse occur in significant numbers, a representative number of leks should be identified and monitored annually. Transects to survey ruffed grouse within each appropriate management unit are also desirable. A more comprehensive monitoring plan is required in order to establish the appropriate monitoring strategy for each management unit, given staffing and budgetary constraints.

Recreational hunting and subsistence harvest should be monitored in each management unit through a variety of techniques. Bag checks and other random sampling by department staff will be recorded for each unit. Hunter questionnaires may also be used to determine hunter effort and success rates. Data will also be recorded for facilities that encourage recreational/educational experiences related to upland game birds.

The potential for cooperative monitoring programs should be investigated further with the Manitoba Wildlife Federation. The "wing barrel" approach for determining age ratios may be considered, or the possibility of training a number of hunters to record data on their outings may prove of value. These cooperative efforts will be outlined in the monitoring plan.

Resource Allocation Strategy

Once population trends are better defined for each species in each management unit, the allowable annual harvest can be allocated. There may be dramatic variations in upland game bird numbers from year to year, and hunters expect bag limits and seasons to reflect the situation on the landscape. The allocation of game birds must also recognize the need for recreational/educational use of the resource, as

well as other social and economic considerations.

Based upon the policy statement established by Manitoba Natural Resources, wildlife resources will be allocated in terms of the following priorities:

1) Treaty Indian hunting rights on unoccupied Crown land
2) Recreational use by residents
3) Recreational use by non-residents where stocks are not fully allocated or utilized by residents

The primary objective in determining hunting seasons and developing viewing opportunities will be to maximize recreational benefits without depleting the resource. It is desirable to design hunting seasons that are lengthy in order to increase the number of outings hunters will make. To ensure that vulnerable populations are not depleted, longer seasons will require lower daily bag limits to spread the harvest out over several months. Seasons will open earlier in the northern part of the province to allow for recreational outings before adverse weather discourages hunters. Seasons will open in the south approximately two weeks later because milder conditions usually prevail longer into October than in the north.

Viewing wildlife may seem at first glance to be a non-consumptive use of the resource, but under some circumstances human disturbance may have a negative effect on survival. Should sharp-tailed grouse be repeatedly disturbed by people wishing to see them on leks, for example, these sites could be abandoned or breeding success could be reduced. Viewing programs or related site developments would only be undertaken where they would not pose a threat to the viability of the upland game bird populations in question. Sites for viewing upland game birds that already occur in areas closed to hunting will be selected over those where hunting occurs, in order to minimize potential conflict between user groups.

Another reason that hunting seasons will open earlier in the north is due to the differences in climate. Even by late September some broods may not be well developed, and a balance has to be struck between allowing the majority of birds to reach maturity and allowing hunting to occur early enough in the fall to take advantage

of favourable weather conditions. Hunters appreciate having standardized seasons from year to year, so that holidays may be planned in advance. Hunters have to exercise good judgement early in the season to avoid spoilage in hot weather, and ensure that they can retrieve downed birds.

Due to the relatively small numbers of non-residents of Manitoba that reside elsewhere in Canada, but hunt upland game birds in this province, the seasons for grouse and gray partridge will be the same for them as for residents of the province. Wild turkey and pheasants, should a season occur, would be available only to residents of Manitoba due to the limited number of these birds.

In the southern portion of the province, the non-resident season for grouse and gray partridge should open the week after the resident season. This will provide high quality hunting experiences for residents on public lands prior to the arrival of non-resident hunters. The one week delay for non-residents is consistent with the seasons set for waterfowl, which also give residents one week of exclusive hunting prior to the arrival of non-resident hunters.

Resident of Manitoba and Canada Hunting Seasons Regime

Ptarmigan

September 1 (or Sept. 2 if the 1st is a Sunday) to the second Saturday in February (on or about February 10)

Gray Partridge; Sharp-tailed, Ruffed, and Spruce Grouse

In the North, Northeast and Central Upland Game Bird Management Units, September 1 (or September 2 if the 1st is a Sunday) to the third Saturday in December (on or about December 20)

In the balance of the province, the season will run from the third Friday in September (not earlier than Sept 15) until the last Saturday in November (on or about November 30)

Wild Turkey

(Residents of Manitoba only) From the last Monday in April (on or about April 23) to the first Saturday in May (on or about May 5), allowing for a two week season each spring

Pheasant*

(Residents of Manitoba only) From the second Monday in October (on or about Oct. 15) to the last Saturday in November.

*Note: A pheasant season will only occur if private reintroduction are successful and wild populations recover to the extent that a season is warranted.

Non-resident of Canada Hunting Seasons Regime

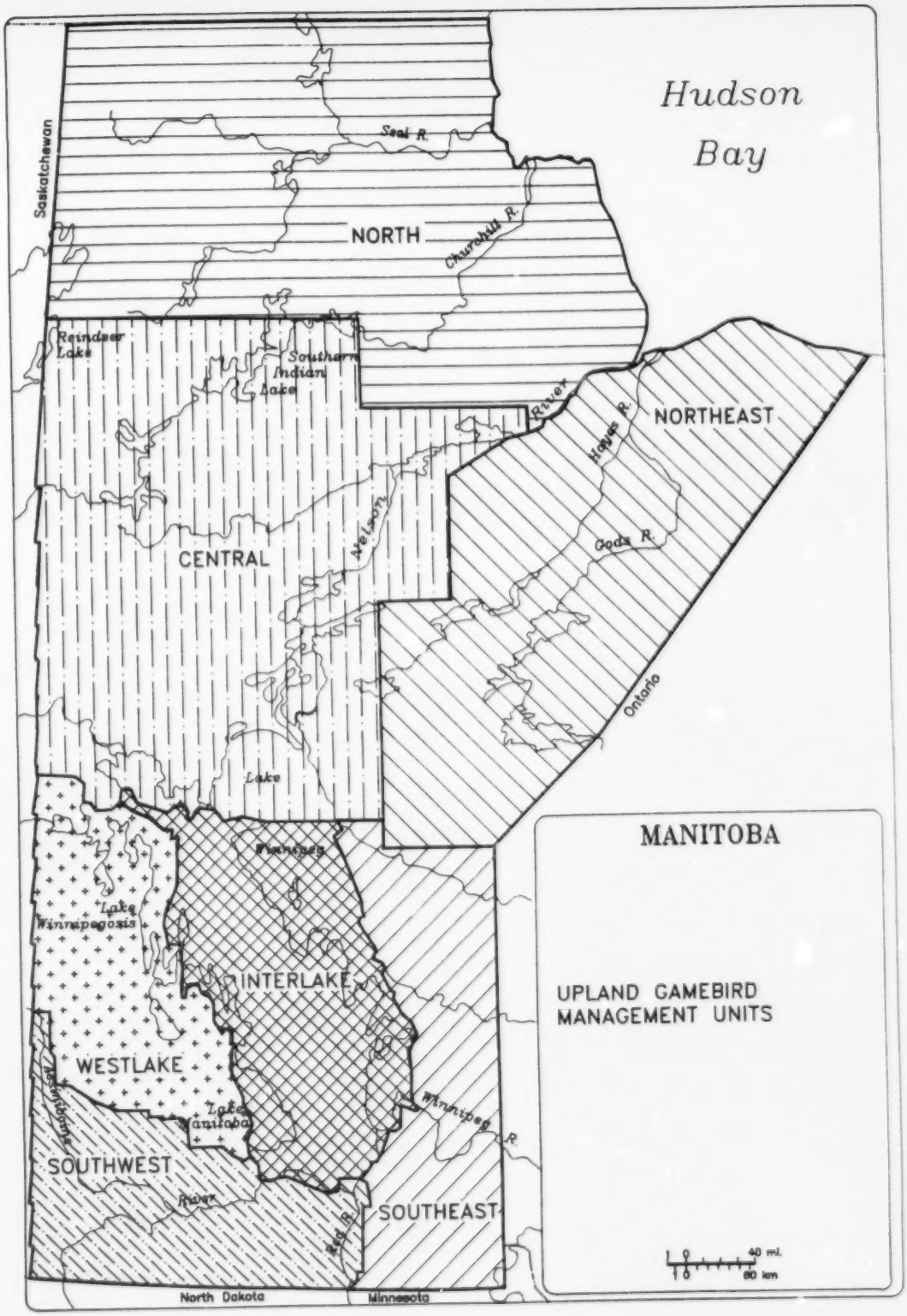
Ptarmigan

(Same as resident season) September 1 (or Sept. 2 if the 1st is a Sunday) to the second Saturday in February (on or about February 10)

Gray Partridge; Sharp-tailed, Ruffed, and Spruce Grouse

(same as resident season) In the North, Northeast and Central Upland Game Bird Management Units, September 1 (or September 2 if the 1st is a Sunday) to the third Saturday in December (on or about December 20)

In the balance of the province, the season will run from the Friday closest to October 1 until the last Saturday in November (on or about November 30)


Hudson Bay
Saskatchewan
Seal R.
NORTH
Churchill R.
Reindeer Lake
Southern Indian Lake
River
Hayes R.
NORTHEAST
CENTRAL
Nelson
Gods R.
Ontario
Lake
Winnipeg
Lake Winnipegosis
INTERLAKE
WESTLAKE
Lake Manitoba
Assiniboine
Winnipeg R.
SOUTHWEST
River
Red R.
SOUTHEAST
North Dakota
Minnesota
MANITOBA
UPLAND GAMEBIRD MANAGEMENT UNITS
40 mi.
80 km

Bag Limits

While season lengths should remain fixed for upland game birds over the next ten years, bag limits may be adjusted for each management unit depending upon the status of its populations. Non-resident daily bags are lower than those for residents, but the possession limits remain the same. This will encourage non-residents to spend a longer time in the province and maximize related economic benefits.

Species	Daily Bag		Possession Limit	
	Resident	Non-Resident	Resident	Non-Resident
Ptarmigan				
normal	10	5	20	20
liberal	10	10	20	20
Sharp-tailed Grouse				
Normal	4	2	8	8
liberal	6	4	12	12
Ruffed Grouse				
normal	4	2	8	8
liberal	6	4	12	12
Spruce Grouse				
normal	4	2	8	8
liberal	6	4	12	12

Species	Daily Bag		Possession Limit	
	Resident	Non-Resident	Resident	Non-Resident
Gray Partridge				
normal	4	2	8	8
liberal	6	4	12	12
Wild Turkey				
normal	1 male	closed	1 male	closed
liberal*				
Pheasant**				
normal	3 males	closed	6 males	closed
liberal	5 males	closed	10 males	closed

* A liberal regime for wild turkeys would be the introduction of a fall season with a bag limit of one male per hunter.

** The bag limit regime will only come into effect when or if a viable wild population of pheasants is established.

Decisions will be made on an annual basis regarding the bag limit regime for each species in each Upland Game Bird Management Unit. Population monitoring and harvest data will be used to determine the appropriate approach, either "normal" or "liberal" for a given species. In the southwest management unit, for example, a "normal" regime may be selected to help rebuild sharp-tailed grouse numbers, hand in hand with habitat improvement efforts, while a "liberal" set of bag and possession limits may be in place for ruffed and spruce grouse, as well as gray partridge. In the Interlake, however, there could be "liberal" bag limits for all species.

Dog Training on Native Grouse

The use of native grouse in summer for commercial dog training is an issue that has drawn considerable public interest in recent years. This activity was long believed to have no effect on grouse numbers, but with the present state of their habitat in southwestern Manitoba, many believe that the harassment of young broods leads to increased losses to predators.

For approximately 50 years, trainers from the United States have come to southern Manitoba in July and August to train pointing dogs on family groups of sharp-tailed grouse. During training, the dogs are followed by trainers on horseback, and range widely over areas of grassland and open bush each day. When a dog encounters a brood of grouse, it stands on point. The trainer approaches and flushes the grouse, often firing a starter's pistol to simulate a real hunting situation.

The dogs seldom injure grouse directly, but there is sufficient reason to

believe that flushing the brood leads to increased predation. It breaks up family groups, fatigues the chicks, causes heat exhaustion, and repeatedly reveals their location to hawks, owls, foxes, and coyotes.

There is no demand from Manitoba dog trainers to train on native game birds. They use pigeons, quail, or pheasants raised in captivity. The non-resident trainers are unwilling to adopt the use of pen-reared birds in Canada, as they prefer to train on wild birds. Landowners and local government officials in the Melita area are very supportive of the trainers, and believe that the requirement to use pen-reared birds will force the trainers out of their area. The economic value to the community is minimal, as the trainers purchase most of their supplies in the United States, but local residents value the cultural exchange. Landowners in the Langruth area, however, and a significant number of concerned citizens have expressed their disapproval of this activity and wish to have the practice prohibited in the province.

In 1989, training on native upland game birds was prohibited on Crown lands, and a moratorium on training with the use of native upland game birds in 1990 was announced. Trainers would be allowed to continue training on private lands with the use of pen-reared game birds until this issue was studied further.

In the spring of 1990, the moratorium was redefined to allow for the training of dogs on native upland game birds commencing July 30, 1990 in a special Dog Training Research Area, comprised of the Rural Municipalities of Edward, Arthur and Albert. In the summer of 1990, five operators trained approximately 175 dogs in this area of southwestern Manitoba. The two trainers who formerly operated in the Langruth area, where training on native upland game birds is now prohibited, found new training grounds in North Dakota and did not return to Manitoba in 1990.

Dr. Richard Baydack, and David Hicks, masters student, from the University of Manitoba Natural Resource Institute received funding from the Special Conservation Fund for a study into the interactions between dogs and native upland game birds in the research area. Their preliminary findings confirmed that dog training has a negative effect on sharp-tailed grouse.

Dog training with the use of native upland game birds is being phased out through attrition. The five trainers licensed in 1990 will be allowed to renew their licences annually, but no major changes in their training grounds may be made, and the licence may not be reassigned to anyone else, including family members. The trainers will be allowed to train no more than 35 dogs each on native upland game birds.

Captive Rearing of Upland Game Birds

Although the primary focus of upland game bird management is on wild populations, captive rearing of some species is permitted and may have implications for wild birds. Wild turkeys and pheasants are raised in captivity and released into the wild by various wildlife organizations and individuals. These efforts are aimed at establishing or supplementing wild populations. Wild turkeys, pheasants, quail and chukar partridge are also raised for commercial shooting preserves in Manitoba and for export to other provinces and states. There are also operators that raise pheasants and quail for restaurants and specialty stores both in Manitoba and internationally.

In 1990, some 52 game bird farm permits were issued to residents of Manitoba. The majority of these permits were for members of game and fish clubs who

were raising pheasants and turkeys for release into the wild. There is one large operation that supplies processed pheasants for the restaurant and specialty market as well as live pheasants and chukar for shooting preserves. Because quail and chukar are unprotected species under the Wildlife Act, those who raise these species do not require a permit. Those who wish to possess pheasants or wild turkeys in captivity, however, are required to obtain a permit.

Other jurisdictions have found that captive rearing of game birds, such as pheasants, is a very costly and inefficient method of enhancing wild populations. Pen-reared birds are more susceptible to predation and survivorship is often very disappointing. Stocking birds into low quality habitat with poor cover and large numbers of predators accomplishes little.

The Wildlife Branch, therefore, will not establish any rearing facilities of its own for raising either native or exotic upland game birds. Due to the potential risk for the spread of disease to wild populations, groups and individuals will not be granted permits to propagate native upland game birds in captivity for release into the wild. Permits will continue to be issued only for the propagation and release of wild turkeys and pheasants and the release sites should be subject to approval by the Wildlife Branch. No change is contemplated in the unprotected status of quail and chukar, but restrictions may be imposed if a problem with disease transmission to populations of wild upland game birds were to arise.

There is some merit in considering the deregulation of pheasants, and perhaps wild turkeys as well. If these species were removed from the list of protected species under the Wildlife Act, it would no longer be necessary to issue game farm permits to raise them in captivity or transport live birds. This would facilitate

commercial trade in these species, and offer diversification opportunities for farmers facing bleak economic prospects in the commodities traditionally raised on the farm. Farmers could rear these birds not only for the restaurant and specialty market, but for paid hunting as well. Monitoring for disease would be dealt with by Agriculture Canada to prevent any potential threat to other wild or domestic animals.

The potential deregulation of pheasants and wild turkeys would have significant implications for the efforts to establish or maintain wild populations. While those pheasants or turkeys released on private land may be afforded protection by the owner restricting access, these birds could be shot at any time on public lands without penalty. As long as efforts to establish a wild population of pheasants and enhance the population of wild turkeys continue, these species will be protected under the Wildlife Act. Should the proponents of the release programs support deregulation, however, action can be taken to facilitate this change.

Shooting Preserves

A shooting preserve is an area of private land in excess of 64 ha (160 acres) licensed for the release and shooting of domestically raised game birds. Shooting preserves offer hunters an opportunity to enjoy a different type of hunting experience. Most wild populations cannot meet the potential demand for hunting opportunities, and thus seasons and bag limits must be imposed. Shooting preserves offer an alternative for hunters, available during the off season to improve their shooting skills and help train hunting dogs in conditions that attempt to replicate those in the wild.

In 1990, seven shooting preserve permits were issued in Manitoba. The interest in shooting preserves has not been as great in Manitoba as elsewhere, largely due to the abundance of readily available hunting in season for wild upland game birds and waterfowl. Interest in shooting preserves is increasing, however, as travel costs and hunting licence fees have risen, competition on public lands in some areas is perceived to be greater than in the past, and access to private land is less readily available. Shooting preserves cannot offer the same quality of hunting as pursuing wild game birds, but they do serve a valuable role in supplementing hunting opportunities.

A shooting preserve permit not only entitles the operator to release and shoot the species of pen-reared game birds listed on the permit, but allows for the propagation of birds as well. If the operator doesn't raise the birds himself, he is authorized under the permit to purchase and transport live game birds from a licensed game bird farm operator.

Guests at a shooting preserve and the operator himself (if he wishes to shoot birds on the preserve) must have a valid wildlife certificate (Hunting licence), to ensure the same standards of hunter safety as normal hunting seasons. A shooting preserve permit only grants special permission to hunt the species listed on the permit, such as pheasants. Regulations governing the protection or hunting of other species of wildlife remain in force on the shooting preserve, so native game birds or big game animals may not be taken unless the hunter obtains the necessary licences and hunts during the regular season for the species in question.

An individual who owns or has access to land, but does not have a shooting preserve permit, may raise, release and shoot unprotected species, such as quail and chukar. He may not, however, purchase and transport protected species, such as

pheasants, to his land for releasing and shooting, unless he has first obtained a shooting preserve permit.

The deregulation of pheasants and possibly wild turkeys would facilitate put-and-take hunting opportunities by individuals or groups of sportsmen. If turkeys and pheasants continue to be protected, however, it may be desirable to revise the shooting preserve regulations to allow individuals to purchase pheasants from a game bird farm, release them on private land to which they have right of access, and hunt them.

The issue of Sunday hunting on commercial shooting preserves could be reviewed, if Sunday hunting for domestically raised game birds were believed to be necessary for the economic viability of these operations. A review of this issue would involve the Manitoba Wildlife Federation, concerned rural municipalities, local government districts and private citizens.

Should pheasants continue to be protected under the Wildlife Act, a new permit should be considered to allow hunters to purchase live pheasants from a game farm, release them on private land (to which they have right of access) and hunt them. This activity could be allowed from September 1 to December 31 each year, enabling hunters to prepare for the forthcoming hunting season for wild birds or supplement hunting opportunities during the season.

The development of additional shooting preserves or more widespread put-and-take hunting by private individuals raises concerns about increased privatization of hunting opportunities. Crown lands will not be approved for use as shooting preserves or for put-and-take hunting opportunities. Even though only private lands may be used for these purposes, some hunters may be concerned about reduced access to private lands that may be increasingly tied up by shooting syndicates. The syndicate members

benefit from assured access to hunting, the farmer benefits from additional income, and wildlife may benefit from improved management of their habitat. The lower income sportsman, however, may find access to private lands increasingly difficult, and have to compete with others on the limited amount of public land available.

Conclusion

This document sets the direction for upland game bird management in Manitoba for the next ten years. Annual updates will be compiled, however, that further refine various aspects of the plan. The status of each species in the various management units will be assessed annually, and bag limits set accordingly through the normal seasons setting process. The effects of the previous year's harvest will be analyzed, and a forecast of the season to come may be provided as part of the annual update.

Any comments or questions related to the first edition of this plan are welcomed and should be direct to the attention of the Manitoba Wildlife Branch's Game Bird Manager.

Bibliography

Annon. 1958. Pheasant Releases 1955 - 1957.
Manitoba Game Branch (unpublished).

Bergerud, A.T. & M.W. Gratson eds. 1988. Adaptive Strategies and Population Ecology of Northern Grouse. University of Minnesota Press, Minneapolis.

Bidlake, L.J. 1966. The Status of Wild Turkeys in Manitoba.
Manitoba Wildlife Branch (unpublished).

Bidlake, L.J. 1967. Summary of Regional Post-season Reports on the 1966 Upland Game Bird Season. Manitoba Wildlife Branch (unpublished).

Bidlake, L.J. 1967. Spring Appraisal of Sharp-tailed Grouse Breeding Populations, 1967.
Manitoba Wildlife Branch (unpublished).

Bidlake, L.J. 1967. Province-wide Appraisal of Sharp-tailed and Ruffed Grouse Breeding Populations, 1967. Manitoba Wildlife Branch (unpublished).

Bidlake, L.J. 1967. Spring Appraisal of Ruffed Grouse Breeding Populations, 1967.
Manitoba Wildlife Branch (unpublished).

Bidlake, L.J. 1968. Spring Appraisal of Sharp-tailed and Ruffed Grouse Populations, Southern and Eastern Regions, 1967. Manitoba Wildlife Branch (unpublished).

Bidlake, L.J. 1968. Analysis of the 1967 Upland Game Bird Season, Eastern Region.
Manitoba Wildlife Branch (unpublished).

Bidlake, L.J. 1968. Analysis of the 1967 Upland Game Bird Season, Southern Region.
Manitoba Wildlife Branch (unpublished).

Bidlake, L.J. 1968. 1968 Experimental Turkey Season.
Manitoba Wildlife Branch (unpublished).

Bidlake, L.J. 1968. Experimental Turkey Season, Fall 1968.
Manitoba Wildlife Branch (unpublished).

Bidlake, L.J. 1969. Analysis of the 1968 Upland Game Bird Season, Sept. 27 -Nov. 30, 1968. Manitoba Wildlife Branch (unpublished).

Bidlake, L.J. 1969. Attempts at Calling Wild Turkeys, Southern Region. Manitoba Wildlife Branch (unpublished).

Bidlake, L.J. 1969. Spring Appraisal of Sharp-tailed and Ruffed Grouse Populations, Southern Region and Whiteshell, April 15 -May 30, 1969. Manitoba Wildlife Branch (unpublished).

Bidlake, L.J. 1969. Analysis of the 1969 Upland Game Bird Season, Sept. 26 -Nov. 30, 1968. Manitoba Wildlife Branch (unpublished).

Bidlake, L.J. 1970. Spring Appraisal of Sharp-tailed and Ruffed Grouse Populations, Southern Region and Whiteshell, 1970. Manitoba Wildlife Branch (unpublished).

Bidlake, L.J. 1970. Analysis of the 1970 Upland Game Bird Season, Southern Region. Manitoba Wildlife Branch (unpublished).

Bidlake, L.J. 1971. Spring Appraisal of Sharp-tailed and Ruffed Grouse Populations, Southern Region & Whiteshell. Manitoba Wildlife Branch (unpublished).

Bidlake, L.J. 1971. Analysis of the 1971 Upland Game Bird Season, Southern Region. Manitoba Wildlife Branch (unpublished).

Bidlake, L.J. 1972. Spring Appraisal of Ruffed and Sharp-tailed Grouse Populations, 1972. Manitoba Wildlife Branch (unpublished).

Bidlake, L.J. 1972. Analysis of the 1972 Upland Game Bird Season, Western Region. Manitoba Wildlife Branch (unpublished).

Bidlake, L.J. 1973. Spring Appraisal of Ruffed and Sharp-tailed Grouse Populations, 1973. Manitoba Wildlife Branch (unpublished).

Brown, R.J. 1967. Observations on the Autumn Dancing-ground Behaviour of the Sharp-tailed Grouse. Manitoba Wildlife Branch (unpublished).

Brown, R.J. 1971. Organization and function of the Spring and Autumn Lek of the Sharp-tailed Grouse. Masters Thesis, University of Manitoba, Winnipeg.

Bryant, J.E. & J. L. Howard. 1955. Preliminary Pheasant Investigation. Manitoba Game Branch (unpublished).

Bump, G. et al. 1947. The Ruffed Grouse - Life History, Propagation, Management. New York State Conservation Department, New York.

Carmichael, R.G. 1966. A Study of Wildlife and Hunter Use on the Broomhill Wildlife Management Area. Manitoba Wildlife Branch (unpublished).

Carmichael, R.G. 1966. Spring Appraisal of Sharp-tailed Grouse Breeding Populations, 1966. Manitoba Wildlife Branch (unpublished).

Carmichael, R.G. 1966. Biologist's Spring Appraisal of Ruffed Grouse Breeding Populations, 1966. Manitoba Wildlife Branch (unpublished).

Carr, H.D. 1961." Spring Appraisal of Ruffed Grouse Populations. Manitoba Game Branch (unpublished).

Carr, H.D. 1962. Spring Appraisal of Sharp-tailed Grouse Populations. Manitoba Game Branch (unpublished).

Carr, H.D. 1962. Spring Appraisal of Pheasant Populations. Manitoba Game Branch (unpublished).

Cunningham, A.G. 1949. Brief History of the Pheasant in Manitoba. Manitoba Game Branch (unpublished).

Darby, D.A. 1976. A Review of Data From Grouse Hunter Check Stations, Gunton and Woodlands, Manitoba, From 1972 to 1975 Inclusive. Manitoba Department of Renewable Resources and Transportation Services. (unpublished)

Davies, D. 1966. Western Region Appraisal of Sharp-tailed and Ruffed Grouse Populations, 1966. Manitoba Wildlife Branch (unpublished).

Davies, D. 1967. Western Region Appraisal of Sharp-tailed and Ruffed Grouse Populations, 1967. Manitoba Wildlife Branch (unpublished).

Davies, D. 1968. Habitat Investigations for Sharp-tailed Grouse near Westbourne and Possible Land Purchase. Manitoba Wildlife Branch (unpublished).

Davies, D. 1968. Conservation Officer Field Bag Checks, Waterfowl and Upland Game, Western Region. Manitoba Wildlife Branch (unpublished).

Davies, D. 1968. Ruffed Grouse Audio Survey. Manitoba Wildlife Branch (unpublished).

Davies, D. 1968. Analysis of the 1967 Langruth Sharp-tailed Grouse Season. Manitoba Wildlife Branch (unpublished).

Davies, D. 1968. Analysis of the 1968 Langruth Sharp-tailed Grouse Season. Manitoba Wildlife Branch (unpublished).

Davies, D. 1969. Spring Appraisal of Sharp-tailed Grouse Breeding Populations, April - May 1968. Manitoba Wildlife Branch (unpublished).

Davies, D. 1969. Ruffed Grouse and Sharp-tailed Grouse Spring Surveys, April - May 1969. Manitoba Wildlife Branch (unpublished).

Davies, D. 1969. Analysis of the 1969 Langruth Sharp-tailed Grouse Season. Manitoba Wildlife Branch (unpublished).

Davies, D. 1970. Western Region Ruffed Grouse and Sharp-tailed Grouse Spring Surveys, April - May 1970. Manitoba Wildlife Branch (unpublished).

Davies, D. 1970. Analysis of the 1970 Langruth Sharp-tailed Grouse Season, Sept. 25, 26, 1970. Manitoba Wildlife Branch (unpublished).

Davies, D. 1971. Western Region Ruffed Grouse and Sharp-tailed Grouse Spring Surveys, April - May 1971. Manitoba Wildlife Branch (unpublished).

Davies, D. 1971. Analysis of the 1971 Langruth Sharp-tailed Grouse Season, Sept. 24, 25, 1970. Manitoba Wildlife Branch (unpublished).

Diduch, A. & S.W. Little. 1953. Upland Game Bird Survey Report, May - September, 1953. Manitoba Game Branch (unpublished).

Goulden, H.D. 1963. Spring Appraisal of Pheasant Populations. Manitoba Game Branch (unpublished).

Goulden, H.D. 1963. Biologist's Spring Appraisal of Ruffed Grouse. Manitoba Game Branch (unpublished).

Goulden, H.D. 1963. Biologist's Spring Appraisal of Sharp- tailed Grouse. Manitoba Game Branch (unpublished).

Goulden, H.D. 1963. Province-Wide Appraisal of Sharp-tailed and Ruffed Grouse Populations. Manitoba Game Branch (unpublished). Goulden, H.D. & R.E.

McWhorter. 1963. Analysis of the 1962 Grouse Hunting Season. Manitoba Game Branch (unpublished).

Goulden, H.D. 1964. Analysis of 1963 Grouse Hunting Season. Manitoba Game Branch (unpublished).

Goulden, H.D. 1964. Province-Wide Appraisal of Sharp-tailed and Ruffed Grouse Populations. Manitoba Game Branch (unpublished).

Goulden, H.D. 1964. Appraisal of Lands Adjacent to Langruth Wildlife Management Area. Manitoba Game Branch (unpublished).

Goulden, H.D. 1965. Analysis of the 1964 Sharp-tailed Grouse Season. Manitoba Wildlife Branch (unpublished).

Goulden, H.D. 1965. Biologist's Appraisal of Ruffed Grouse Breeding Populations. Manitoba Wildlife Branch (unpublished).

Goulden, H.D. 1965. Biologist's Spring Appraisal of Sharp- tailed Grouse Breeding Populations. Manitoba Wildlife Branch (unpublished).

Goulden, H.D. 1966. Province-Wide Appraisal of Sharp-tailed and Ruffed Grouse Populations. Manitoba Wildlife Branch (unpublished).

Goulden, H.D. 1966. Analysis of the 1966 Sharp-tailed Grouse Season. Manitoba Wildlife Branch (unpublished).

Goulden, R.C. 1961. Spring Appraisal of Sharp-tailed Grouse Populations. Manitoba Game Branch (unpublished).

Grooms, S. 1982. Modern Pheasant Hunting. Stackpole Books, Harrisburg.

Harper, W.K. 1968. Spring Appraisal of Sharp-tailed and Ruffed Grouse Populations. Wildlife Branch (unpublished).

Holmstrom, C. 1972. Spring Appraisal of Sharp-tailed and Ruffed Grouse Populations, Southern Region and Whiteshell. Dept of Mines, Res. & Env. Mgmt. Report.

Holmstrom, C. 1972. Analysis of the 1972 Upland Game Bird Season, Southern Regional. Dept of Mines, Res. & Env. Mgmt. Report.

Howard, J.L. 1955. A Report on the 1955 Pheasant Restocking Project. Manitoba Game Branch 1955 (unpublished).

Howard, J.L. 1956. A Report on Midwinter Pheasant Conditions in Manitoba. Manitoba Game Branch (unpublished).

Howard, J.L. 1956. A Report on the 1956 Pheasant Restocking Project. Manitoba Game Branch (unpublished).

Howard, J.L. 1957. Pheasant Wintering Success.
Manitoba Game Branch (unpublished).

Howard, J.L. 1957. Report on 1956/57 Winter Pheasant Study.
Manitoba Game Branch (unpublished).

Howard, J.L. 1957. Pheasant Releases 1957.
Manitoba Game Branch (unpublished).

Johnsgard, P.A. 1973. Grouse and Quails of North America.
University of Nebraska Press, Lincoln.

Johnsgard, P.A. 1983. The Grouse of the World.
University of Nebraska Press, Lincoln.

Kohn, S.C. 1976. Sharp-tailed Grouse Nesting and Brooding Habitat in Southwestern North Dakota. North Dakota Game and Fish Dept.

McAtee, W.L. ed. 1945. The Ring-necked Pheasant and its Management in North America. The American Wildlife Institute, Baltimore.

McKay, I. & R. Carmichael. 1970. Sharp-tailed Grouse Inventory, Chatfield Lake, Narcisse, and Sandridge Areas. Manitoba Wildlife Branch (unpublished).

McWhorter, R.E. 1961. Province Wide Appraisal of Sharp-tailed and Ruffed Grouse Populations, 1961. Manitoba Game Branch (unpublished).

McWhorter, R.E. 1961. An Analysis of the 1960 Sharp-tailed Grouse Hunting Season. Manitoba Game Branch (unpublished).

McWhorter, R.E. 1962. Analysis of the 1961 Grouse Hunting Season. Manitoba Game Branch (unpublished).

McWhorter, R.E. 1963. Province Wide Appraisal of Sharp-tailed and Ruffed Grouse Populations, 1962. Manitoba Game Branch (unpublished).

McWhorter, R.E. 1962. Analysis of the 1946 - 1953 Sharp-tailed Grouse Banding Project in Southern Manitoba. Manitoba Game Branch (unpublished).

McWhorter, R.E. 1962. Notes on the Melita Cover Plot, Winter 1961/62. Manitoba Game Branch (unpublished).

Minish, B.R. 1987. The Feasibility of Re-establishing Greater Prairie Chicken in Manitoba. Masters Thesis, University of Manitoba, Winnipeg.

Moen, A.N. 1983. Agriculture and Wildlife Management. CornerBrook Press, Lansing.

Nitchuk, W.M. 1967. The Reproductive Behaviour and Physiology of the Sharp-tailed Grouse in Northern Manitoba. Manitoba Wildlife Branch (unpublished).

Ransom, A.B. 1958. Report on Manitoba's 1958 Pheasant Release. Manitoba Game Branch (unpublished).

Ransom, A.B. 1959. Spring Appraisal of Pheasant Populations. Manitoba Game Branch (unpublished).

Ransom, A.B. 1959. Spring Appraisal of Sharp-tailed Grouse Populations. Manitoba Game Branch (unpublished).

Ransom, A.B. 1959. Spring Appraisal of Ruffed Grouse Populations. Manitoba Game Branch (unpublished).

Ransom, A.B. 1960. Spring Appraisal of Ruffed Grouse Populations. Manitoba Game Branch (unpublished).

Ransom, A.B. 1960. Spring Appraisal of Sharp-tailed Grouse Populations. Manitoba Game Branch (unpublished).

Ransom, A.B. 1960. Spring Appraisal of Pheasant Populations. Manitoba Game Branch (unpublished).

Ransom, A.B. 1960. An Analysis of the 1959 Grouse Season. Manitoba Game Branch (unpublished).

Ransom, A.B. 1961. Spring Appraisal of Pheasant Populations. Manitoba Game Branch (unpublished).

Ransom, A.B. 1964. Evaluation of the Dancing Ground Census of Sharp-tailed grouse. Manitoba Game Branch (unpublished).

Ransom, A.B. 1964. Evaluation of Sharp-tailed Grouse Hunting Season Bag Checks. Manitoba Wildlife Branch (unpublished).

Ransom, A.B. 1965. Summary of Regional Post Season Reports on the 1964 Upland Game Season. Manitoba Wildlife Branch (unpublished).

Ransom, A.B. 1965. Analysis of the 1965 Sharp-tailed Grouse Season. Manitoba Wildlife Branch (unpublished).

Reeve, A.J. 1951. Pheasant Range in Manitoba. Manitoba Game Branch (unpublished).

Robertson, R.J. 1962. Spring Appraisal of Ruffed Grouse Populations, 1962. Manitoba Game Branch (unpublished).

Robertson, R.J. 1964. Biologist's Spring Appraisal of Sharp- tailed Grouse. Manitoba Game Branch (unpublished).

Robertson, R.J. 1964. Biologist's Spring Appraisal of Ruffed Grouse. Manitoba Game Branch (unpublished).

Robertson, R.J. 1965. Province-wide Appraisal of Sharp-tailed and Ruffed Grouse Populations, 1965. Manitoba Wildlife Branch (unpublished).

Robinson, W.L. 1980. Fool Hen The Spruce Grouse on the Yellow Dog Plains. University of Wisconsin Press.

Sexton, D.A. 1978. Breeding Season Movements and Habitat Use of Female Sharp-tailed Grouse. Masters Thesis, University of Manitoba, Winnipeg.

Schmidt, R.K. 1969. Notes on the Behaviour of Willow Ptarmigan at Cape Churchill, Manitoba. Manitoba Wildlife Branch (unpublished).

Stephen, W.J.D. 1958. An Analysis of the 1958 Grouse Season Hunter Interview and Bag Check. Manitoba Game Branch (unpublished).

Urban, R.E. 1969. Analysis of the 1968 Upland Game Bird Season, Eastern Region. Manitoba Wildlife Branch (unpublished).

Urban, R.E. 1970. Analysis of the 1969 Upland Game Bird Season. Manitoba Wildlife Branch (unpublished).

Urban, R.E. 1971. Analysis of the 1970 Upland Game Bird Season. Manitoba Wildlife Branch (unpublished).

Van Zyll De Jong, S. 1968. On the Potential Introduction and Establishment of Capercaillie in Manitoba. Manitoba Game Branch (unpublished).

Yake, B. 1978. Analysis of the 1977 Upland Game Bird Season in Game Hunting Area 24. Manitoba Dept of RR&TS MS Report 78-10.

Yake, B. 1979. Analysis of the 1978 Upland Game Bird Season in Game Hunting Area 24. Manitoba Dept of RR&TS MS Report 78-10.

Endnotes

1. Ibid. "Increasing the Numbers of Grouse" pp. 703 - 708.

2. Ibid. pp. 686-702.

3. Ibid.

4. Bergerud, A.T. & M.W. Gratson "Survival and Breeding Strategies of Grouse", in Adaptive Strategies and Population Ecology of Northern Grouse, Bergerud & Gratson eds., University of Minnesota Press, 1988. pp. 578 - 684.

5. Schmidt, R.K. 1969. "Notes on the Behaviour of Willow Ptarmigan at Cape Churchill, Manitoba."

6. Personal Communication, Dr. R. Baydack.

7. Personal Communication, Dr. R.E. Jones.

8. Minish, B.R. 1987. The Feasibility of Re-establishing Greater Prairie Chicken in Manitoba.

9. Bergerud, A.T. & M.W. Gratson, "Survival and Breeding Strategies of Grouse", in Adaptive Strategies and Population Ecology of Northern Grouse, Bergerud and Gratson, eds., University of Minnesota Press, 1988. pp. 474 - 575.

10. Personal Communication, Dr. R.E. Jones.

11. Bergerud, A.T. "Population Ecology of North American Grouse" in Adaptive Strategies and Population Ecology of Northern Grouse, Bergerud & Gratson eds., University of Minnesota Press, 1988. pp. 578 - 684.

12. Jones, R.E. 1987. Perdix iv Gray Workshop pp. 87 - 90.

13. Maples et al. 1987. Perdix iv Gray Partridge Workshop pp. 91 - 105.